Call-A.P.P.L.E.

Volume 8, Number 1
January 1985

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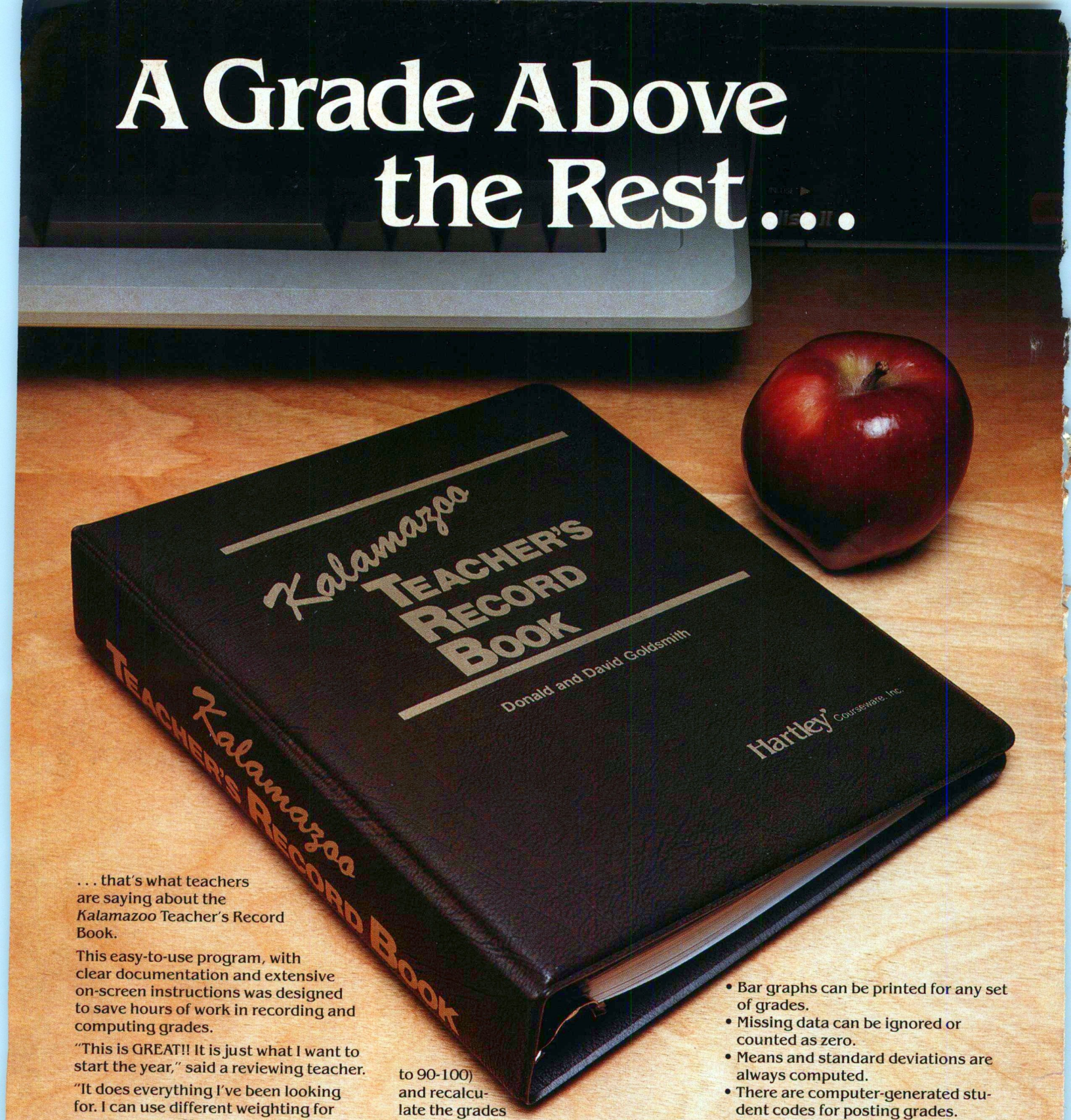

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REACH NEW HORIZONS with CH Products

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The second generation MACH II and MACH III Joysticks incorporate a **new slide-switch spring disconnect** feature that **requires no stick deflection** and **new rotary trims** which are **four times more precise**.

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These highly accurate and reliable 360 degree microcomputer cursor controls used for games, business and graphics applications provide more features, greater durability, and longer life cycles. Plug in compatible with Apple II, IIE, IIC, IBM PC, PCjr and TRS-80 Color Computers.
MACH II $44.95/MACH III $54.95

PADDLESTICKS

PADDLESTICKS are a new and unique paddle control design that promises to return the fun and excitement back to paddletype games. They are faster, easier to operate and less fatiguing than conventional type paddles. The PADDLESTICKS operate as a single-axis joystick and are currently plug-in compatible with the Apple II, IIE and IIC personal computers. $44.95 (pair)

MICRO-TRAK TRACKBALL

The MICRO-TRAK TRACKBALL is the ultimate 360 degree cursor control that is engineered with the latest state-of-the-art technology. The MICRO-TRAK is controlled by two custom designed microprocessors and is 100% digital for higher reliability. The unit plugs into the standard game I/O and is 100% software compatible. It has four switch selectable modes of operation and requires no additional hardware or software. Both the "Positioning Mode" and "Velocity Mode" have a choice of two sensitivity levels. In addition the "Velocity Mode" has an "Auto-Center" feature that returns the cursor to the selected center position to emulate a self-centering joystick. There is also a "Rapid Fire" feature and dual switches for either left or right handed operation. Available November 1984 for Apple II, IIE and IIC personal computers. $99.95

Manufactured in U.S.A.

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About the Cover

You, too, can be a winner if you manage your personal finances with a computer.

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AP GRAPHICS	SFLR	$17.00	0 4
APGRAPHICS/GRAPHICS BUILDER	SPGRPH	$25.00	0 6
AP FILE	SAPF	$18.50	0 2
APMAIL II V3.0	SAM3	$25.00	0 3
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AP TEST	SAPT	$18.50	0 2
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CALENDAR PAK III	SCALPK	$79.00	1 0
DICE	SDIC	$12.50	0 2
DIRECTORY TITLE WRITER	STITWR	$15.00	0 2
DOLLARS AND $ENSE	SDAS2E	$75.00	2 0
DOLLARS AND $ENSE	SDAS2C	$83.50	2 0
DOLLARS AND $ENSE	SMCDAS	$112.00	2 0
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EZ-PILOT	SEAP	$28.50	0 4
HIGHER FONTS 1	SHFI	$13.00	0 2
HIGHER GRAPHICS II	SHIGRA	$15.00	0 8
HIGHER TEXT PLUS	SHTP	$27.50	0 4
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LIFESAVER	SDISRE	$21.00	0 5
LISA QUICKDRAW-DEMO PROGRAM	SQDRAW	$39.50	0 2
MAC PUBLIC DOMAIN SOFTWARE	SMCPDS	$7.00	0 2
MAC THE KNIFE VOL-1	SMCKNF	$29.00	0 9
MODEM MAGICIAN	SMODMA	$38.00	1 0
MULTI-TREIVE	SMUL	$50.00	0 9
PROGRAM LINE EDITOR	SPLE	$15.00	0 3
PROZAP	SPZAP	$25.00	0 3
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PUBLIC DOMAIN SOFTWARE-CATALOG	FPDS	$1.00	0 2
SOFT SEVENTY	SS70	$20.00	0 3
STAR GAZER'S GUIDE	SSTAGU	$15.00	0 8
SYMBOL SYMON	SSYM	$20.00	0 3
THE FONT ALBUM	SFTALB	$12.50	0 2
THE SPREADSHEET V2.0	STSS	$65.00	2 0
THINK TANK	STHITK	$119.00	1 0
THE FRIENDLY COMPUTER	SFRCOM	$27.50	0 13
TITLE MASTER	STITMA	$20.00	0 8
TURTLE SOFT	STUR	$22.50	0 8
UTILITY DISKPAK 6B-16	SD6B	$18.50	0 2
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ZARDAX III	SZARDA	$160.00	2 0
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III CHEERS (QUARTERLY ISSUE)		$12.50	0 1
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VOLUME 2 (JUL-DEC 79)	SA2	$12.50	0 1
VOLUME 3 (JAN-JUN 80)	SA3	$12.50	0 1
VOLUME 4 (JUL-DEC 80)	SA4	$12.50	0 1
VOLUME 5 (JAN-JUN 81)	SA5	$12.50	0 1
VOLUME 6 (JUL-DEC 81)	SA6	$12.50	0 1
VOLUME 7 (JAN-JUN 82)	SA7	$12.50	0 1
VOLUME 8 (JUL-DEC 82)	SA8	$12.50	0 1
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VOLUME 9B (APR-JUN 83)	SA9B	$12.50	0 1
VOLUME 10A (JUL-SEP 83)	SA10A	$12.50	0 1
VOLUME 10B (OCT-DEC 83)	SA10B	$12.50	0 1
VOLUME 11A (JAN-MAR 84)	SA11A	$12.50	0 1
VOLUME 11B (APR-JUN 84)	SA11B	$12.50	0 1
VOLUME 12A (JUL-SEP 84)	SA12A	$12.50	0 1
PASCAL ANTHOLOGY -1 (JAN-DEC 81)	SPA1	$12.50	0 1
DISK OF THE MONTH 01/84	SMO184	$11.00	0 1
DISK OF THE MONTH 02/84	SMO284	$11.00	0 1
DISK OF THE MONTH 03/84	SMO384	$11.00	0 1
DISK OF THE MONTH 04/84	SMO484	$11.00	0 1
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DISK OF THE MONTH 07/84	SMO784	$11.00	0 1
DISK OF THE MONTH 08/84	SMO884	$11.00	0 1
DISK OF THE MONTH 09/84	SMO984	$11.00	0 1
DISK OF THE MONTH 10/84	SM1084	$11.00	0 1
DISK OF THE MONTH 11/84	SM1184	$11.00	0 1
DISK OF THE MONTH 12/84	SM1284	$11.00	0 1

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FARWORD	SFARWO	$12.50	0 2
GRAFMAGIC	SGRAFM	$12.50	0 2
GRAPHICS BUILDER	SGRABU	$12.50	0 2
MICROWRITER IIe	SMICWT	$12.50	0 2
MICROWRITER II +	SUWTR +	$12.50	0 2
MORTGAGES,DEPRECIATION, AND FINANCIAL CALCULATIONS	SMORTG	$12.50	0 2
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VOLKSFILER	SVOLKS	$12.50	0 2
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ZAPT	SZAPT	$12.50	0 2

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COSMIC COMBAT	SCCO	$12.50	0 2
CRITICAL MASS	SCRIMS	$15.00	0 3
DISKPAK 7	SD7	$17.50	0 2
EAMON SERIES	SEAMON	$5.00	0 2
FLY WARS	SFLYWS	$15.00	0 4
FREE FALL	SFREFL	$15.00	0 2
JELLYFISH	SJELLY	$15.00	0 2
LA TRIVIATA	SLATRI	$27.50	0 6
MICROBE	SMIC	$30.00	1 0
MINOTAUR	SMINOT	$15.00	0 2
MUMMY'S CURSE	SMCU	$12.50	0 2
PATH TACTICS	SPATH	$27.50	0 13
PENSATE	SPENST	$28.00	0 3
PLASMANIA	SPLASM	$15.00	0 3
REPTON	SREPTN	$15.00	0 3
SNAKE BYTE	SSNABT	$15.00	0 2
SARGONVANIA	STRA	$25.50	0 4
TWERPS	STWERP	$15.00	0 2
U-BOAT COMMAND	SUBCOM	$12.50	0 8
XYPHUS	SXYPHS	$28.00	0 4

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PRODUCT NAME	CODE	PRICE	LBS.OZ.
AP-BURNER EPROM BURNER-PROGRAMMER CARD	HEPROM	$75.00	1 0
AP CONTROLLER	HAPC	$85.00	0 4
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AP DRIVE	HAPD	$205.00	6 0
AP.LCASE 1	HLC1	$30.00	0 2
AP.LCASE 1 w/DICE	HLCIA	$37.50	0 3
AP.LCASE 2	HLC2	$25.00	0 2
AP.LCASE2 w/DICE	HLC2B	$30.00	0 2
APPLESURANCE	HAUD	$85.00	1 0
APPLE IIe 80-COLUMN BOARD	H80C	$120.00	0 8
APPLE III DISK DRIVE	HDR3	$285.00	6 0
BASF 3.5' MICRO-FLOPPY (BOX 5)	HBASF	$22.50	0 7
DISK BANKS	HDBA	$4.50	1 0
10 - GENERIC DISKETTES	HGEN10	$15.00	0 8
100 - GENERIC DISKETTES	HGEN10	$125.00	5 0
DISKETTES-VERBATIM (10/BOX)	HVEB	$25.00	1 0
DRIVE ADAPTOR IIc	H2CCBL	$15.00	0 3
FLASHCARD 288K	HSSD	$525.00	2 0
FLASHCARD 144K	HSSS	$345.00	2 0
FLASHCARD 144K UPGRADE KIT	HSSU	$200.00	0 2
FLIP SORT DISK ORGANIZER	HFLS	$22.50	3 0
HOME CONTROLLER	HHOC	$40.00	0 8
A.P.P.L.E. HARD DISK (10-MEGABYTE)	HHARDR	$1095.00	26 0
KOALA TOUCH TABLET	HPAD	$95.00	2 0
KOALA TOUCH TABLET	HKOA2C	$95.00	2 0
LIS'NER 1000: VOICE RECOGNITION CARD	HLISNR	$179.00	2 0
LIS'NER 1000: Phonetic Speech Synthesis Upgrade	HLISVR	$75.00	1 0
MAC COVERS	HMCCVR	$25.00	2 0
MACH III JOYSTICK	HJMACH	$44.00	1 0
MACH III JOYSTICK	HJOMA3	$49.00	1 0

HARDWARE

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MACPAK	HMACPK	$64.95	6 0
MEDIA MATE 3	HDSMT3	$12.99	2 0
MEMOREX MICRO-FLOPPY (BOX 10)	HDMEMO	$44.00	1 0
MOCKINGBOARD	HMOBII	$165.00	2 0
MOCKINGBOARD	HMOB2C	$165.00	3 0
MULTIMODEM IIe	HMOD2E	$199.00	3 0
MULTIMODEM HC3	HMODC	$225.00	4 0
MULTITECH MODEM	HMODHC	$425.00	5 0
MULTITECH MODEM	HMODPC	$399.00	5 0
MULTIVIEW 80/160 - video display card	HMULTI	$249.00	2 0
PADDLE-ADAPPLE	HPADDL	$25.00	0 5
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PANASONIC PRINTER RIBBONS	HPANRI	$14.00	0 5
PANASONIC RS232-SERIAL OPTION	HSERIN	$85.00	1 0
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PRINTER RIBBON - TALLY MT160L	HTRC	$12.50	0 7
PRINTER RIBBON - TALLY MT 180L	HTRI	$17.00	1 0
PROMODEM 1200	HPRMOD	$399.00	6 0
PROMODEM 1200 IIc	HPRO2C	$399.00	7 0
PROMODEM 1200A	HMODA	$349.00	5 0
PROMODEM 1200M	HMODM	$425.00	7 0
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PIXY PLOTTER 3 PARALLEL INTERFACE	HTPIP	$299.00	18 0
PIXY PLOTTER 3 SERIAL INTERFACE	HTPAS	$299.00	18 0
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5-BLUE	HPLBLU	$10.00	1 0
5-RED	HPLRED	$10.00	1 0
5-GREEN	HPLGRE	$10.00	1 0
1 EA. GREEN,VIOLET,BROWN ORANGE,PINK	HPLPEN	$10.00	1 0
OIL-BASE PEN SET			
5-BLACK	HPNBLK	$12.50	1 0
5-BLUE	HPNBLU	$12.50	1 0
5-RED	HPNRED	$12.50	1 0
5-GREEN	HPNGRE	$12.50	1 0
1 EA. GREEN,VIOLET,BROWN ORANGE,PINK	HPLPTR	$12.50	1 0
PLOTTER PAPER (100 SHEETS- GLOSSY)	HPLGPA	$8.50	2 0
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PRINTPAK	HPRPAK	$39.95	3 0
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REPEATERRR	HRPT	$25.00	0 5
SERIAL INTERFACE ADAPTOR CABLE 2c	HSERC	$17.50	0 6
SERIAL INTERFACE ADAPTOR CABLE Mac	HSERM	$17.50	0 6
SOFTCASE	HSOFTC	$39.00	3 0
SUPER FAN II	HFAN	$79.00	3 0
TYPING AID	HPAG	$13.00	2 0
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ULTRA-ROM ADD-ON/ APU-2	HRENUM	$29.00	0 3
ULTRA-ROM ADD-ON/ DISK COPY/EDIT	HDSCPY	$32.00	0 3
UNIVERSAL SERIAL INTERFACE CARD EPSON	HSEREM	$99.00	0 6
VIEWMASTER 80-COLUMN CARD	HVIE80	$149.00	2 0
VERSACARD (NO CABLE)	HVRC	$150.00	2 0
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w/6' FEMALE SERIAL CABLE	HVRC2F	$160.00	2 0
w/6'MALE SERIAL CABLE	HVRC2M	$160.00	2 0
w/1' FEMALE SERIAL CABLE	HVRC3F	$160.00	2 0
w/1' SERIAL CABLE	HVRC3M	$160.00	2 0
6' PARALLEL CABLE	HVPC	$20.00	0 4
6' FEMALE SERIAL CABLE	HVSLF	$20.00	0 4
6' MALE SERIAL CABLE	HVSLM	$20.00	0 4
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VERSACARD ROM IDS	HVPRID	$30.00	0 3
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HARDWARE & ACCESSORIES Continued

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ZARDAX KEYBOARD CONNECTOR	HZARKY	$7.00	0 5
A.P.P.L.E. T-SHIRT (LARGE)	HTSHL	$5.00	0 5
A.P.P.L.E. T-SHIRT (MEDIUM)	HTSHM	$5.00	0 5
A.P.P.L.E. T-SHIRT (SMALL)	HTSHS	$5.00	0 5

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Call -A.P.P.L.E. JUN 80	MJUN80	$2.00	0 8
Call -A.P.P.L.E. NOV/DEC 80	MN-D80	$2.00	0 8
Call -A.P.P.L.E. JANUARY 81	MJAN81	$2.50	0 8
Call -A.P.P.L.E. FEBRUARY 81	MFEB81	$2.50	0 8
Call -A.P.P.L.E. MAR/ APR 81	MM-A81	$2.50	0 8
Call -A.P.P.L.E. MAY 81	MMAY81	$2.50	0 8
Call -A.P.P.L.E. JUNE 81	MJUN81	$2.50	0 8
Call -A.P.P.L.E. JULY/AUG 81	MJ-A81	$2.50	0 8
Call -A.P.P.L.E. SEPTEMBER 81	MSEP81	$2.50	0 8
Call -A.P.P.L.E. OCTOBER 81	MOCT81	$2.50	0 8
Call -A.P.P.L.E. NOV/DEC 81	MN-D81	$2.50	0 8
Call -A.P.P.L.E. JANUARY 82	MJAN82	$2.50	0 8
Call -A.P.P.L.E. FEBRUARY 82	MFEB82	$2.50	0 8
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9 "	10.50	13.97
10 "	11.50	15.15
11 "	12.50	16.33
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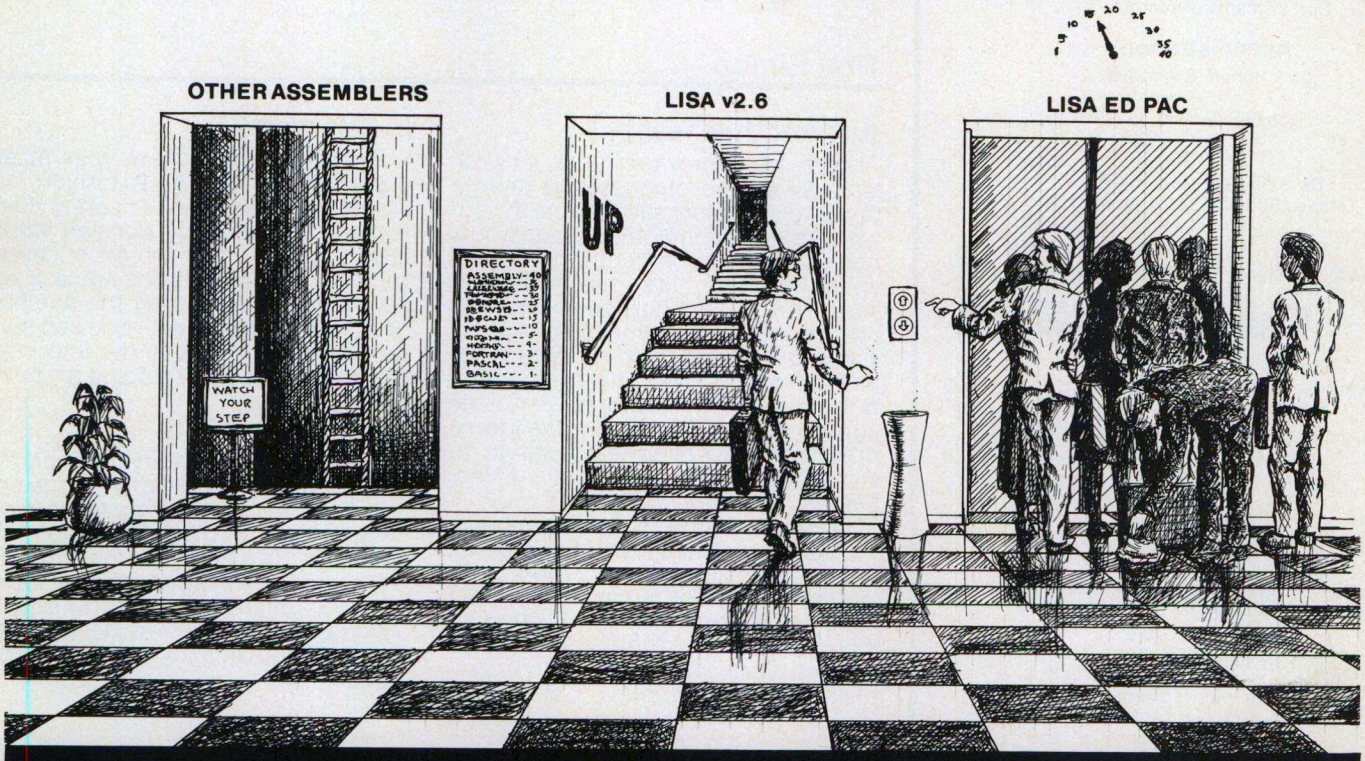

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The INNER CIRCUIT

Don Elman

Just Another Year

With 1984 safely behind us, let's collectively thumb our noses at George Orwell and consider some of the ways in which high technology enhances our personal freedom. In contrast to Orwell's vision of a centralized electronic network that could rob people of their privacy and individuality, today's microcomputer offers an increased sense of independence. From the communication power of word processors to the autonomy of self-paced educational programs, this "mind lever" serves to strengthen each individual's effectiveness in society.

A prime example of this principle is in the area of managing personal finances. Of course we don't mean simply balancing your checkbook by computer, which most people recognize as—at best—an inefficient use of the machine's capabilities. When applied to the more complex tasks of monitoring a household budget, keeping track of investment portfolios, or keeping up with the cash flow of a small business, microcomputers have freed many people from dependence on cluttered, error-prone ledger sheets and expensive, professional accountants.

In This Issue

To kick off the new year in appropriate **Call -A.P.P.L.E.** fashion, our lead feature, **Using and Choosing Home Finance Programs** by Norman Wood, gives a detailed comparison of several software examples for the Apple. If you find yourself considering the purchase of a program that is not reviewed here, the author describes all the important criteria you'll need for judging any home finance software.

Cecil Fretwell and Gary Little continue their technical examination of the newest Apple II's with a program that provides **A Clock for the IIc**. In **ProDOS Prose from a ProDOS Pro**, Ken Kashmarek presents valuable information about Apple's advanced operating system. Next Ken Watters gives us **Menumaker**, a general programming aid for creating screen menus.

In the rest of the magazine you'll find our regular array of columns, letters, departments, and useful information to help you make up your own mind about how to get the most from your Apple. Would Big Brother have approved?

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Using and Choosing Home Finance Programs

Norman J. Wood

ONE of the most frequently mentioned applications for the Apple is home finances, checkbook balancing and budgeting. The market is now filled with programs that are designed to do these tasks and much more. After using and sampling several of these programs I have decided that the average Apple owner could benefit from my experience. I will discuss the development of selection criteria, and then review several examples of currently available programs. The article concludes with recommendations on evaluating alternative programs that you find and potential developments expected in the home finance field.

Most of us do not derive our sole income from a small business. This means that payroll and invoices and inventory management are probably not our primary concern. This is true for my case and therefore I have limited this discussion accordingly. Likewise the tax implications related to running a small business are beyond the scope of this article. Within this more limited framework I will suggest a method for picking a software package that will 'make all your problems go away'.

While I am a mechanical engineer by trade and have used computers at work, I am not a hacker. I purchased my Apple as many do still for the potential it represented for my personal use. Over the years it has not disappointed me. Home finance is one of the areas that seems ideal for the personal computer.

Beginner's Approach

My first approach was to develop my own program in BASIC. After several months struggling with AppleSOFT, making string variables line up the decimal point and other tricks, I realized that I would need to purchase a program to use before it was too late to do any good. At that time my choices were limited and the programs relatively primitive. As time went on, I became more fascinated in the applications and less in writing my own home finance version.

Within a year I had outgrown my first program's capability in a number of categories. I also discovered 'the bug'. I worked around the first problem. I don't remember how much data I reentered and corrected because of the errors made by the program, but I know that I was too embarrassed to admit to my wife that this home finance program might not be saving us time and money. I learned quickly that while I was willing to fix mistakes, my wife just wanted to know where all the money went. I also got an earful when the program did something peculiar as she was entering data. Sound familiar? Well my search has gone on. Many things have changed in the last four years—for example, I've upgraded to new versions, switched programs, traded in my II+ for a *//e*, and my family has grown more comfortable with the Apple. Likewise, our expectations for the software capabilities has grown. In any case, I still need a program that will help us manage our home finances.

The new buyer now is confronted with a software store on every other corner. The most difficult questions are: What do you really need? How to decide? Who to believe? Some advice would be welcome. While I have gone through this process the hard way, it need not be as difficult for others. For example, I could have done better developing a realistic list of needs before buying software. This is harder than it sounds. The potential buyer may already be overwhelmed with new things to be learned about the Apple, PRO-DOS, etc.

I will develop the selection criteria I feel is appropriate to this application and discuss why these criteria are important to me. Then you may either use the criteria or modify them to fit your needs.

Data Needed

First, I identify what data I want to collect and manage. I need cash flow record keeping, including a checking account. Many of these accounts pay interest, most charge for services, and regular bills may be paid directly to the creditors. Each of these transactions must be tracked in order to reconcile statements. One way to really keep track of where it all goes is to wash everything through checking. For example, have all income deposited there and pay everything by check. This is not really practical, since I have more than one account! I also have two credit unions. Another problem is keeping track of cash. I need the capability to track more than one account and must minimize the uncontrolled cash no matter what system I select. Therefore I need a running balance on each account.

That brings up a more complicated requirement—budget planning. I have filled several home budget workbooks by expense category in an effort to bring spending under control and establish a budget plan. The result in my experience is a short term discipline whose accuracy is, at best, greater than $100. It would be nice to be confident that the cash would not run out before the end of the month. The check stub register, if kept faithfully and accurately, can be an effective cash flow yardstick but is much less useful as a budget plan, when weather change impacts heating costs, while taxes, insurance and other irregular bills hit. Therefore I need good correlation between the checkbook and budget plans. How many categories would be useful? At the beginning a few would do: Mortgages, Food, Auto, Utilities, Medical, Household/Garden, Insurance, Maintenance, Entertainment, Savings/Investments, Miscellaneous, Contributions; altogether about a dozen expenses.

The federal income tax form is my guide for the types of data required for tax reporting. For each I have estimated how many entries to expect per year. If it is relatively small I prefer to do a little calculation work at the end of the year instead of using more categories infrequently through the year. In my case contributions represent the most work so deserve a separate category. I am considering division of dental from medical and segregation of prescriptions. I am influenced by how easy is it to set up additional categories in the program. Most of the other tax data I need comes to me in statements, monthly or at years' end. I choose not to keep track of that data when someone else is doing it for me. The only other home financial task I need to do is estimate and plan income taxes for which I prefer a simple spreadsheet template using data estimated from my home finance program (but that is another story).

I have found that several small business expenses categories are desirable, for example: Postage, Office Supplies, Miscellaneous, Business, and Apple! So there it is! The cash flow data is defined and the useful categories identified including several

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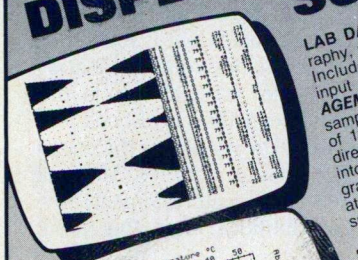

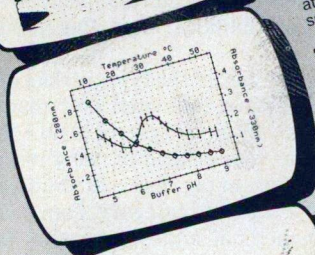

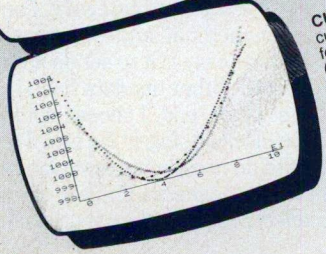

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income tax codes. Other data may be included but should, in my opinion, be considered at a lower priority or for growth. In fact, I rediscovered *The Pareto Principle*, more popularly known as the 80/20 rule. Simply restated: "80% of the work time is spent solving 20% of the essential problems." In this case it is useful to apply it this way: 80% of the most important requirements should work best in the program (most time will be spent there) and the remaining 20% of the needs probably drive the program cost the most. I suggest prioritizing the needs list against this test and evaluate the cost-to-benefit ratio.

Options

The following are important options to consider. Is it desirable to manage liabilities? Is a balance maintained in a credit card account? Are loan payoff records desired? If the credit card accounts are paid off each month, then budgeting and tracking will each require two entries, one at each purchase and another at bill paying time. Asset records can also be managed. If this data is collected, a net worth statement may be produced. One option frequently advertised is check printing. If bills are paid from home it would eliminate a manual transaction. One of my goals is to replace, not duplicate, manual record keeping. I try to print checks once a month to reduce the inconvenience of setting up the paper. If the number of checks written is relatively small, then the cost of the special checks and setup time may overshadow the advantages (and extra program cost, remember the 80/20 rule).

Printed reports are essential to support income tax reporting, and as an option to provide permanent backup for your records. I consider them lower on the list because the essential requirements are not difficult or costly to include in the program. However I sure wouldn't want to print out all the transactions (mine now run to more than 1000 per year!). I rely on the monthly category totals and a year end dump of the important tax data. I think that graphical displays are very useful in evaluation of budgets and expenses. It is easy to see at a glance what's happening and spot trends.

User Factors

The user skills and experience with the Apple and in accounting are very important. These will determine how much will be expected from the Apple and the program. For example adherence to standard accounting practices and statistical trend analyses may or may not be be of interest. For my own part, I expect the program to be more user friendly and not greatly more capable than my specific needs. I prefer this approach over general purpose programs or ones aimed at the 'hacker'. I do not need strict adherence to accounting practices. Some program features are specifically designed to make the program user friendly. For example the data entry mode should include auto indexing check numbers, default dates, and abbreviated keystrokes for designation of the categories. These are a must! I like screen prompts. Even when I am very familiar with a program I appreciate the immediate reference to the command options. I feel that prompts are faster than completely menu driven programs without sacrificing user friendliness. Commands that are *not* on help screens or prompts must be memorized or referred to on a command summary card. It is desirable that the key letter remind the user of the meaning of the command intended (For example 'ESC' or 'Q' for quit). I place a high priority on the program to give a clear error message and prompt recovery and re-entry. Since no program can be completely foolproof, I expect the documentation to warn about abnormal exits, explain how to recover—for example a warning not to hit RESET if appropriate. It is essential that you plan to sit down at the computer yourself and be sure that you are comfortable. I check that the command keystrokes are conveniently located and are consistent in meaning throughout the program. As I discovered my applications becoming more ambitious, programs that satisfied these larger needs operated more slowly, another example of the 80/20 rule!. Therefore I evaluate the most used sequence of menus and functions for perceived speed. Note that perceived speed is also a function of the

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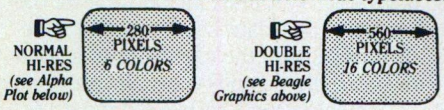

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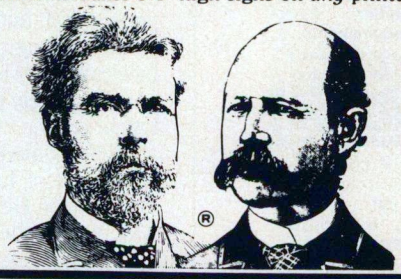

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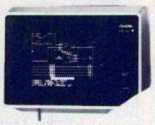

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number of transactions loaded. If you test the system with only a few loaded it may appear faster than you need and then disappoint you later. I have found that as I rely more on the financial program, I need greater reliability. I can't afford to lose data or fail to recover a program crash. The program should explain how to maintain data integrity and backups. This should be easy to do. Provisions for program backup are essential. The skills and experience of each user must be considered. Adequate documentation consists of a tutorial, menu tree, command summary and reference material. It must be well organized and easy to read. A sample data base and report samples is also most useful.

At this point I have identified my needs and have quite a list of questions to use in the program evaluation.

Flexibility & Suitability to Need

Use the Pareto Principle: 80% most needed features work best? Is 100% worth the extra program cost, multiple disks needed, is a slower speed acceptable? Does the program have the needed capacity (or far too much): I need at least twelve accounts, the checking account capable of tracking at least 24 expense categories and at least 6 tax codes. It must include a reconcile function. Some provision for split transactions is needed. A notation field size of at least 15 characters is necessary. Added notation provision would be very useful so that payee and memo don't have to share the same space. Since some monthly transactions are repetitive, some method for making these easier to handle is desireable. I have indicated that check printing is a lower priority in the evaluation table.

Reports & Analysis

There are several features which facilitate analysis of the data. A search function is necessary. It must include at least the capability to search by number, and date segregated by category, reconciled or not. It may include the capability to search through the notation field. I need the capability to make previous month corrections, entries and deletions. This is not standard accounting practice but is handy with more than one operator each entering transactions, particularly if the program allows closing each month. A more formal system, including double entry which provides the added accuracy and error correction traceability, is not needed for my records and is an unnecessary complication for non-expert users.

It is important that the program support my printer. Since there are many alternatives, I check whether the program requires any special printer capabilities such as 80 or 132 characters. It must provide the capability to initialize the printer and send the codes required. The program may require two disk drives. If it does, I try to test it in those modes to assure myself that it is comfortable to use for my skills level. I am wary of extensive disk switching in the home environment.

As I indicated above, I need a method to compare actual expenses with budgets. Does the program interface with financial planning programs such as VISICALC? The VISICALC interface capability is an optional feature provided the printed reports are adequately planned. I have therefore left them at a relatively low priority.

Before buying I ask: Will program updates be provided? Have others had favorable support from the author and/or distributor? Help will be needed sometime! If the program is widely used, help may be found through an Apple user club.

Program Evaluations

The primary source of program reviews is periodicals; a few reference books are also available. Unfortunately changes in the personal computer field occur more rapidly than the books can be revised. For example, *The Book of Apple Software 1984* has reviews on several obsolete programs and is missing the current best sellers. Other books available in my area are just partial lists of programs with prices. Another sign of the times is the demise

of two good magazines, *Peelings II* and *Softtalk*. They both had reliable reviews.

My survey of the magazines and reference books does not encourage me to recommend them as a source of dependable evaluation data. They either lack objectivity, parrot back the manufacturer's specifications, or fail to identify the criteria matching my own.

The evaluations included here are with programs I have used and reviewed. Copyable programs are assumed to be harddisk compatible though I do not consider it cost effective to buy one for this application alone.

1. **Basic Accounting** by Practical Peripherals: This is a modular program written in BASIC. It is more properly a financial data base system designed for the sophisticated user with well defined financial objectives. Each month of each account is handled as a separate file so the transaction capacity is very large. Linking and custom audit reports connect these for balance accumulations. The reconcile function operates on one file at a time so that several analyses are required to complete balancing an account spanning more than one month. Provision is made for custom analyses and reports. These can span a range of months, selected budget categories, and several disks. Audit report data may also be stored on separate DOS 3.3 disks in "DIF" format for use by spreadsheet programs. The program includes several unique features to custom configure the check printer and memo, predesignated payee addresses for labels.

Budget reports may also reviewed as graphs with options to compare actuals with the average or a calculated trend line. The graphs may be saved to disk for subsequent access by a printer dump program. While the program has almost all the features a home finance program might need, the detailed file structure combined with the relatively slow disk access make the program cumbersome. The menu trees are extensive and use option names which do not clearly describe the functions.

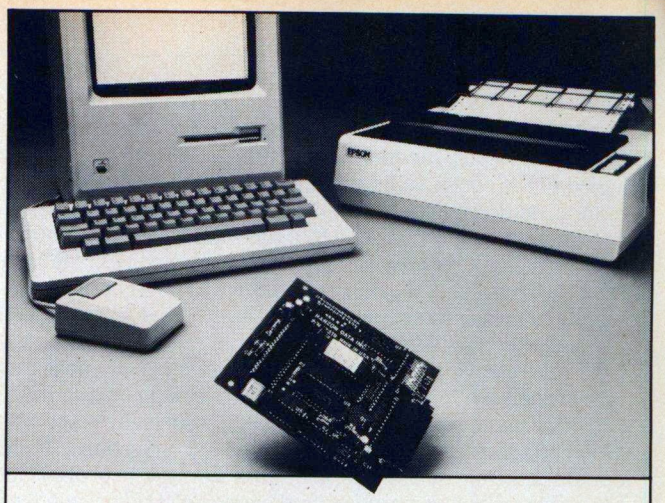
The documentation gives hints on handling complex transactions and a variety of applications. However, the recommended disk setup for a pair of checking accounts, assets & liabilities, DIF file, audits reports files, two credit cards and backups would require 12 diskettes. This is more disk swaps than in any other program reviewed, and more than I am comfortable with in the home environment.

Overall, the program is poorly conceived for the home environment and requires a relatively sophisticated user.

2. **Certified Personal Accountant** by Sundex: This package includes separate categories for stocks as well as assets and liabilities. Updating current values allows production of a balance sheet. The command structure is straightforward and the program interfaces with other Sundex products such as a portfolio manager. It only provides transaction splitting to four accounts, no graphics, and no reconciliation search or page scrolling. The documentation is tutorial oriented, as yet lacks adequate reference development. However, there is a very thorough help system built in. It flags due and overdue planned transactions. The reconcile function is only provided on bank accounts, for example credit cards are not included. I found it difficult to use the 6 character abbreviations for categories. It requires the use of FID to perform backup and other utility functions. It is less capable than comparably priced programs. I'd recommend it only with improvements and for use with the other modules.

3. **Dollars and $ense**, Monogram Software: this program which is written in Pascal is the most comprehensive home finance program I have reviewed. This capability results in speed penalties in menu operations, disk I/O, and screen refreshing. It includes a tutorial on disk, has extensive menus and a relatively large command set. While command options are shown on screen prompts, they are not self explanatory. It has excellent color graphics including trend lines. These can be custom made to collect account groups as desired.

If a Grappler printer interface card is not present, the graphics screen can be saved to disk. It can then be dumped to a printer with



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another program. The transaction description field is shared between payee and the notation memo. However, a memo can be added to the check stub during check writing. It is a double entry system, and requires several steps to switch from one type of operation to another. I found that the selection of the control keys awkward, however provision is made to change them. I felt that the reference portion of the documentation was poorly presented, containing tutorial instructions and many references to other sections.

While the presentation of the printed reports is very good, I'd prefer to reserve the account type and number of entries for the screen analysis. In their place I'd rather have a notation field. The use of account numbers is superfluous, especially since the program provides dynamic and/or alphabetic selection . Excellent documentation of sample accounts listings are provided on business and tax preparation applications of *Dollars and $ense*.

4. **Money Street**, Computer Tax Service: This is a fast assembly language program organized around the check register. The documentation includes excellent advice on simple financial management and tax record keeping using the program. A separate data disk is required for each account without transfer capabilities. Split transactions are just duplicate lines with the same check number. It also requires a separate utility disk to provide two program backups and monthly report capability. I found some commands awkward and the utility disk had an inconsistent command structure. It is less capable than equivalent priced alternatives.

5. **Personal Finance Manager**, Apple Computer: This is limited to one account, and it requires FID to backup the data, which I found awkward and confusing when multiple copies had been made. The reconcile function lacks some editing capabilities. It only allows screen formatted printed reports. PFM is no longer marketed but is still listed in references and is a quality program.

6. **The Practical Accountant**, Softlink: Clear menus and excellent documentation & tutorial make the program best directed to the small business. It supports check printing, and income and expense cash flow analyses by category and subcategory. This subcategory type organization might take a little more planning for home use than other methods. It is written in PASCAL and runs through the menus at a reasonable speed. Growth capacity requires additional drives. However it does not support any abbreviated keystroke techniques to invoke categories.

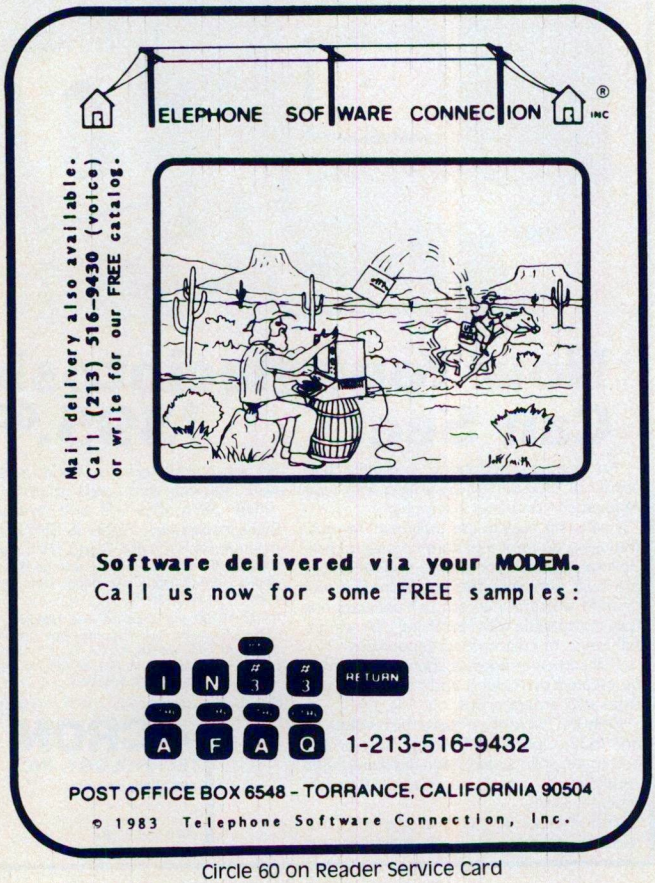
7. **The Accountant**, Decision Support Software: The modular program construction is written in BASIC and most functions require significant disk I/O which slows the effective speed. It is, however, capable of handling large numbers of accounts and tax codes. It has a very fast balance sheet and powerful reconcile functions. It has a very well designed user command interface; command and key selection is straightforward. A "calculator" is included for use during other operations—a handy feature. It is primarily set up to do asset and liability management. Cash flow and budget management is not well implemented. Unfortunately the graphics are unscaled. The double entry is more rigorous than I need for home use. The check numbers and reconcilation mark are internal to the description field. Valuable notation space is lost. Some of the printed reports make poor use of paper space and take too long to produce. The Visicalc interface, $20 extra, is very well done.

8. **The Home Accountant** by Continental Software: This program has a modular construction requiring significant disk I/O through most functions. The menu trees are extensive. The effect is slow setup and operation. It is a full function system but lacks attention to the user interface. For example, the system requires entry into the current month only. Each month must be closed before moving to the next month and back entries or deletions are not possible. For example it would not be possible to back date checking account automatic transactions, interest, or finance charges at reconcilation time. The documentation neglects to explain that ghost entries are needed, to circumvent this shortcoming. The documentation, while well organized, does not adequately explain the program operation and limitations. The documentation also disclaims support for some printers, hopefully yours is covered. There are several better home finance program choices available.

9. **Time is Money**, Turning Point Software: Most of the program and all of the data are RAM based and, being written in assembly language, the speed is impressive. This a compact program with a minimum of extras. For example, recurring transactions are created by duplicating & updating prior transactions, no automatic transaction files are maintained. The result is similar but the method is essentially manual. Essential utility functions such as balance carry forward to another book, configuration setup for the printer and 40/80 column setup are on a separate master disk. Excellent screen design and prompts make it very friendly. It includes short cuts through the menus which further enhances its speed. Help screens are available throughout the program to define terms. Close reading, however is required to fully appreciate the power and value of group designations. Custom reports are possible by identifying groups to include in each category, e.g. networth, or cash flow statements. A refund category is included as a transaction type which eliminates the need for negative entries. Growth capability is provided with two 'books' per disks, and utilities to span disks. A very good value. The documentation is somewhat primitive and the instructions on report groups is poorly presented.

Recommendations:

List your needs, the criteria is most important. The best approach is to rewrite the criteria used in the tables to reflect your needs, then try candidate programs to grade them. Select candidate software from personal recommendations, user groups, and "bundled with the computer" programs. These will have the most consistant quality. Evaluate a couple of the most promising. I suggest borrowing copies from retailers or friends in order to provide at least two hours hands-on for each. Next, prioritize the criteria, remember the 80/20 rule. Try to identify capabilities and criteria that—if absent or less than "good"—would disqualify the software,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and features that you feel that you must have. Reduce the choices to two with this new selection criteria. Don't forget to include the other user(s) in this final phase. Then be comfortable with the selection.

With my own evaluation criteria I have summarized the grading from the two tables by identifying those programs which met the minimum requirements. I scored table 1 on the following basis: EXCLNT: 4, GOOD: 3, FAIR: 2, POOR: 1, and "--" (NOT SUPPORTED):0.

Evaluation Summary

Name	MINIMUM	MEETS SCORE	TOTAL RANK
Basic Accounting	NO	32	
Certified Personal Accountant	NO	29	
Dollars and $ense	YES	35	2
Money Street	NO	29	
Personal Finance Manager	NO	22	
Practical Accountant	NO	28	
The Accountant	YES	32	3
The Home Accountant	NO	28	
Time is Money	YES	42	1

Your actual grading could be quite different depending upon the relative importance of your criteria.

Future Developments

Several home finance programs are becoming available that use the extra 64K memory and the mouse available in the Apple *//e* and *//c*. This will be very attractive if the application requires significant storage, and where the program can achieve more rapid passage through the menu trees. This larger memory may also allow home finance programs to include other optional functions such as, automatic calculation of interest in checking accounts and investments.

For the more sophisticated users there are powerful data base systems which allow custom configuration; however these require considerably more computer and accounting expertise. Some integrated software may include modules for home financal applications. Banking organizations are beginning to offer telecommunication connections with bill paying capabilities. These can be expected to include some home finance utilities. Specialized finance programs that offer analytical tools for investments, mortage calculations, and yield on IRA's are also available. Standard interfaces between these and other programs are not likely, however. Many of these developments will be useful but will not replace a good home finance program for some time—remember the 80/20 rule.

Companies Mentioned

1. Practical Peripherals, 31245 La Baya Drive, Westlake Village, CA 91362
2. Sundex Software Corp,4755 Walnut Street, Boulder, CO 80301
3. Monogram, 8295 S. La Cienga, Inglewood CA 90301
4. Computer Tax Service, P.O. Box 7915, Incline Village, NV 89450
5. Softlink, 3255-2 Scott Blvd., Santa Clara, CA 95051
6. Decision Support Software, 1438 Ironwood Drive, McLean, VA 22101
7. Arrays Inc/Continental Software, 11223 South Hindry Ave, Los Angeles, CA 90045
8. Turning Point Software, 11A Main Street, Watertown, MA 02172

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NOVATION APPLE CAT II	319.00	230.00
MICROSOFT Z-80 SOFTCARD CP/M	345.00	219.00
PCPI 6MHz APPLI-CARD (Z-80 CP/M)	375.00	269.00
VIDEX VIDEOTERM 80 COLUMN CARD (SOFTSWITCH, AND INV. CHAR SET)	319.00	199.00
VIDEX ULTRATERM	379.00	225.00
WIZARD IPI PRINTER INTERFACE	88.00	69.00
WIZARD BPO BUFFERED PRINTER INTERFACE (16K BUFFER + GRAPHICS	179.00	129.00
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ORANGE MICRO GRAPPLER +	145.00	114.00
NEC HI-RES GREEN MONITOR (JB1201)	285.00	153.00
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MICRO-SCI A2 DRIVE W/CONTROLLER	445.00	249.00
PROWRITER 8510AP PRINTER	495.00	349.00
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GIBSON LIGHT PEN/LPS II	249.00	169.00
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Table 1

Legend: How well program accomplishes function.
--- Indicates function not supported.
* Must be "GOOD" or better.

PROGRAMS	Reduced Keys *	Automatic Transactions *	Split Transactions *	Screen Prompts *	Backup Data & Program *	Error Handling	Sample Data Base	Reconcile Function	Search Functions	Fast Perceived Speed	Budget vs Actual	Printed Reports	Documentation
MUSTS: Desending Order of Importance - - >													
1.BASIC ACCOUNTING	GOOD	FAIR	FAIR	GOOD	GOOD	FAIR	FAIR	FAIR	GOOD	POOR	FAIR	GOOD	GOOD
2.CERTIFIED PERSONAL ACCOUNTANT	FAIR	GOOD	FAIR	GOOD	POOR	FAIR	FAIR	FAIR	---	FAIR	GOOD	GOOD	GOOD
3.DOLLARS and $ENSE	GOOD	FAIR	GOOD	FAIR	GOOD	FAIR	GOOD	GOOD	GOOD	FAIR	EXCLNT	GOOD	FAIR
4.MONEY STREET	GOOD	---	FAIR	FAIR	GOOD	EXCLNT	---	FAIR	FAIR	GOOD	FAIR	GOOD	GOOD
5.PERSONAL FINANCE MANAGER	GOOD	---	---	GOOD	POOR	POOR	---	FAIR	GOOD	FAIR	GOOD	POOR	GOOD
6.PRACTICAL ACCOUNTANT	POOR	---	GOOD	GOOD	GOOD	GOOD	---	GOOD	GOOD	FAIR	---	GOOD	EXCLNT
7.THE ACCOUNTANT	GOOD	GOOD	GOOD	GOOD	GOOD	FAIR	GOOD	GOOD	GOOD	POOR	POOR	FAIR	GOOD
8.THE HOME ACCOUNTANT	FAIR	GOOD	GOOD	GOOD	FAIR	FAIR	---	FAIR	GOOD	POOR	GOOD	GOOD	POOR
9.TIME IS MONEY	GOOD	GOOD	GOOD	EXCLNT	EXCLNT	EXCLNT	GOOD	GOOD	GOOD	EXCLNT	GOOD	GOOD	FAIR

Table 2

PROGRAMS	Price	Number of Accounts	Transaction Capacity	Number of Categories	Number of Tax Codes	Notation Field Size	Check Printing	Disk Drives Required	Printer Initialization	Visicalc Interface	Harddisk Compatible	Graphics
MUSTS:	>$12	>1000 per yr	>24	>6	>15							
1.BASIC ACCOUNTING	$100	UNLMITED	UNLMITED	100	<--INCL	16	FAIR	ONE OR TWO	GOOD	YES	YES	GOOD
2.CERTIFIED PERSONAL ACCOUNTANT	$99.95	>90	>1000	120	50	>15	FAIR	ONE OR TWO	GOOD	---	YES	---
3.DOLLARS AND $ENSE	$100	$100	2000/DISK	ONE	25	25	GOOD	ONE OR TWO	GOOD	---	NO	EXCLNT
4.MONEY STREET	$99.95	ONE PER DISK	2400/YR	100	<--INCL	15						---
5.PERSONAL FINANCE MANAGER	$75	ONE	2400/YR	24	ONE	14	---	ONE	---	---	NO	FAIR
6.PRACTICAL ACCOUNTANT	$149.95	ONE PER DISK	634-2800/YR	50+ 300 SUB	20	20+ 36 SUB	GOOD	TWO TO FOUR	---	---	NO	---
7.THE ACCOUNTANT	$129	63	2000-4000/YR	63	63	17	---	ONE OR TWO	GOOD	EXCLNT	YES	POOR
8.THE HOME ACCOUNTANT	$74.95	12	>1000/YEAR	50	1	15	FAIR	TWO	GOOD	---	---	GOOD
9.TIME IS MONEY	$100	240	750 1500/BOOK	240	<--INCL	27+ 27 SUB	GOOD	ONE OR TWO	GOOD	---	YES	EXCLNT

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We don't expect you to buy an Applied Engineering peripheral on loyalty alone, but when you compare our products to those made by QUADRAM, MICROSOFT, AST and others you'll find out why Applied Engineering means a quality design, innovation, craftsmanship and total Apple compatibility.

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Circle 62 on Reader Service Card

The //c Versus the //e (Part 2): A Clock for the //c

Cecil Fretwell and Gary Little

IN the December 1984 issue of *Call -A.P.P.L.E.*, we described some of the technical differences between the //e and the //c. This month we present a piece of software that utilizes a unique feature of the //c to add a clock to that computer.

Part of the //c mouse firmware includes the ability to enable an interrupt signal whenever a video blanking interval begins (called the VBL interrupt). Every standard video display has a vertical blanking interval which occurs between successive refreshes of the screen (every 1/60 of a second). We will call this interval a *tick*.

The assembly language program in Listing 1 shows the code to simulate the clock card. If you don't like messing with assembly language entry of code, Listing 2 is an APPLESOFT program that generates the same code and stores it on disk. Later on, we will describe a program to start the clock and to test it.

At the outset, we must warn you that this code will only work with ProDOS 1.1 or a later version. The code does not run with earlier versions of ProDOS because of a bug in the ProDOS interrupt handler.

First let's look at the assembly language program (Listing 1). Lines 32 to 94 install the clock code and start the clock ticking. Lines 33 and 34 "grab" a page of memory by safely moving th current HIMEM value down using the GETBUFR call. In the unlikely case that this allocation fails, the system will bomb to the system monitor. For those of you familiar with the FREEBUFR call, it will "wipe" out the clock code.

Lines 45 to 52 move the clock code to the allocated page. Note that this code does not care where it is installed because all appropriate absolute addresses are properly adjusted when the code is moved. If you choose to use an origin other than $61B1, there are two points to remember about the move process. The CLOCK code starting in line 104 must start on a page boundary. Second, in our code, Page $62 does not represent a legal 65C02 op code nor does it represent a data byte. For example, if we would have chosen Page $31 for the CLOCK code, the days of the month table would be changed in the move process.

Since we are working with ProDOS and want to use some interrupt driven software, lines 59 to 62 informs ProDOS that such code exists. In the unlikely case that ProDOS gets unhappy about this intrusion, the system will bomb to the system monitor.

Lines 70 to 75 set up the VBL interrupt process. The code in lines 81 to 84 sets up the JMP instruction to the ProDOS "read

Listing 1

```
                        1
                        2
                        3
                        4  ************************
                        5  * CLOCK ROUTINE FOR IIC *
                        6  *         BY           *
                        7  *    CECIL FRETWELL    *
                        8  *         AND          *
                        9  *     GARY LITTLE      *
                       10  ************************
                       11
                       12  ******************************
                       13  * PREPARED USING MERLIN PRO *
                       14  ******************************
                       15
                       16  PAGE     =     $06          ;HOME ADDRESS FOR CODE
                       17  MOUSTAT  =     $77C         ;MOUSE STATUS BYTE
                       18  GETBUFR  =     $BEF5        ;GET BUFFER SUBROUTINE
                       19  MLI      =     $BF00        ;MLI CALL
                       20  DATETIME =     $BF06        ;HOOK TO CLOCK ROUTINE
                       21  DATE     =     $BF90        ;PRODOS DATE
                       22  MINUTE   =     $BF92        ;PRODOS MINUTE
                       23  HOUR     =     $BF93        ;PRODOS HOUR
                       24  SETMOUSE =     $C412        ;ADDRS FOR MODE SUB.
                       25
                       26            ORG   $61B1
                       27
                       28  ********************************
                       29  * GET SPACE FOR THE CLOCK CODE *
                       30  ********************************
                       31
61B1: 78               32            SEI                ;GIVE US A CHANCE
61B2: A9 01            33            LDA   #1           ;GET ONE PAGE
61B4: 20 F5 BE         34            JSR   GETBUFR
61B7: B0 22            35            BCS   BOMB         ;IF FAILED, CRASH
                       36
                       37  ***********************************
                       38  * MOVE THE CODE TO ITS FINAL HOME *
                       39  ***********************************
                       40
61B9: 8D FA 61         41            STA   CMDBUF+3     ;ADDRESS FOR MLI CALL
61BC: 85 07            42            STA   PAGE+1       ;ADDRESS FOR MOVE CODE
61BE: 8D 08 BF         43            STA   DATETIME+2   ;ADDRESS FOR MLI CLOCK
61C1: 64 06            44            STZ   PAGE         ;SET UP FOR MOVE
61C3: A0 00            45            LDY   #0           ;SET UP MOVE INDEX
61C5: B9 00 62         46  MOVE      LDA   CLOCK,Y      ;GET A BYTE OF CODE
61C8: C9 62            47            CMP   #>CLOCK      ;AN ABSOLUTE ADDRESS?
61CA: D0 02            48            BNE   MOVE1        ;IF NOT
61CC: A5 07            49            LDA   PAGE+1       ;CHANGE THE ADDRESS
61CE: 91 06            50  MOVE1     STA   (PAGE),Y     ;AND MOVE BYTE OF CODE
61D0: C8               51            INY                ;DONE WITH MOVE?
61D1: D0 F2            52            BNE   MOVE         ;IF NOT
                       53
                       54  ********************************
                       55  * INSTALL THE INTERRUPT HANDLER *
                       56  * USING PRODOS CONVENTIONS.     *
                       57  ********************************
                       58
61D3: 20 00 BF         59            JSR   MLI          ;ALLOCATE INTERRUPT
61D6: 40               60            HEX   40
61D7: F7 61            61            DA    CMDBUF
61D9: 90 01            62            BCC   FIRE1        ;IF SUCCESS, BRANCH
61DB: 00               63  BOMB      BRK                ;CRASH SYSTEM
                       64
                       65  ************************************
                       66  * SET THE MOUSE MODE FOR "MOUSE OFF" *
                       67  * AND "VBL INTERRUPTS ON".           *
                       68  ************************************
                       69
61DC: AD 12 C4         70  FIRE1     LDA   SETMOUSE     ;OFFSET TO SETMOUSE
61DF: 8D FE 61         71            STA   MOUSEIT      ;PREPARE FOR IND CALL
61E2: A2 C4            72            LDX   #$C4         ;SET UP INT. ENABLE
61E4: A0 40            73            LDY   #$40
61E6: A9 08            74            LDA   #8           ;MOUSE MODE CODE
61E8: 20 FB 61         75            JSR   DOMOUSE      ;ENABLE VBL INTERRUPTS
                       76
                       77  ******************************************
                       78  * INFORM PRODOS THAT A CLOCK CARD EXISTS. *
                       79  ******************************************
```

Continued

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SUPERTERM	MORE	NO	YES	NO	NO	NO	NO	YES	YES
WIZARD 80	MORE	NO	NO	NO	NO	YES	NO	YES	YES
VISION 80	MORE	YES	YES	NO	NO	YES	NO	NO	NO
OMNIVISION	MORE	NO	YES	NO	NO	NO	NO	YES	YES
VIEWMAX 80	MORE	YES	YES	NO	NO	YES	NO	NO	YES
SMARTERM	MORE	YES	YES	NO	NO	NO	YES	YES	NO
VIDEX	MORE	NO	YES	YES	NO	YES	YES	NO	YES

The VIEWMASTER 80 works with all 80 column applications including CP/M, Pascal, WordStar, Format II, Easywriter, Apple Writer II, VisiCalc, and all others. The VIEWMASTER 80 is THE MOST compatible 80 column card you can buy at ANY price!

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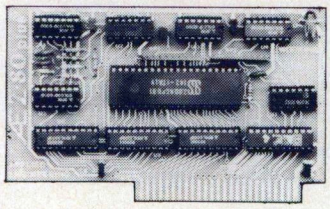

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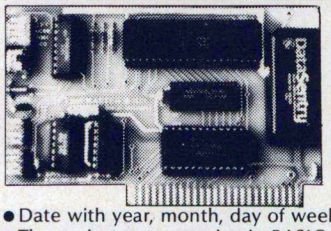

- Absolutely, positively totally PRO-DOS and DOS 3.3 compatible.
- Time in hours, minutes, seconds and milliseconds (the ONLY PRO-DOS compatible card with millisecond capability).
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Full emulation of all other clocks. It's easy for the H.O. to emulate other clocks, we just drop off features. That's why the H.O. can emulate others, but none of the others emulate us.

	PRO-DOS COMPATIBLE	INCLUDES DOS DATER	MILLISECOND TIME	YEAR DATA	LARGEST SAMPLE SOFTWARE	REMOTE SET PORT	BSR PORT	EMULATES ALL OTHER CLOCKS
H.O	YES	YES	YES	YES	YES	YES	YES	YES
BRAND A	NO	NO	YES	NO	NO	NO	NO	NO
BRAND C	NO	NO	NO	NO	NO	NO	NO	NO
BRAND M	NO	NO	NO	NO	NO	NO	NO	NO
BRAND P	YES	YES	NO	YES	NO	NO	NO	NO
BRAND S	NO	NO	NO	YES	NO	NO	NO	NO
BRAND T	YES	NO	NO	NO	NO	NO	YES	NO

The Timemaster II H.O. will automatically emulate the correct clock card for the software you're using. You can also give the H.O. a simple command to tell it which clock to emulate.

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Listing 1 Continued

```
                        80
61EB: A9 4C             81          LDA #$4C        ;PLANT CLOCK ADDRESS
61ED: 8D 06 BF          82          STA DATETIME    ;FOR MLI CLOCK CALLS
61F0: A9 90             83          LDA #<GETIME
61F2: 8D 07 BF          84          STA DATETIME+1
61F5: 58                85          CLI             ;ENABLE INTERRUPTS
61F6: 60                86          RTS             ;THE CLOCK IN ON.
                        87
61F7: 02                88  CMDBUF  HEX 02
61F8: 00                89          HEX 00
61F9: 00 62             90          DA  CLOCK
                        91
61FB: 6C FE 61          92  DOMOUSE JMP (MOUSEIT)
61FE: 00                93  MOUSEIT HEX 00          ;ADDRESS OF MOUSE
61FF: C4                94          HEX C4          ;SUBROUTINE
                        95
                        96
                        97  *********************************
                        98  * HERE'S THE INTERRUPT HANDLER. *
                        99  * IT IS CALLED 60 TIMES PER     *
                       100  * SECOND (EVERY TIME THAT A VBL *
                       101  * INTERRUPT OCCURS).            *
                       102  *********************************
                       103
6200: D8               104  CLOCK   CLD             ;CLEAR DECIMAL MODE
6201: AD 7C 07         105          LDA MOUSTAT     ;GET MOUSE STATUS BYTE
6204: 29 08            106          AND #8          ;VBL INTERRUPT?
6206: D0 02            107          BNE CLOCK1      ;IF YES, BRANCH
6208: 38               108          SEC             ;REFUSE TO PROCESS
6209: 60               109          RTS             ;AND RETURN TO MLI
620A: EE 83 62         110  CLOCK1  INC TICKS       ;ADVANCE TICKS
620D: AD 83 62         111          LDA TICKS
6210: C9 3C            112          CMP #60         ;ROLL SECONDS?
6212: D0 27            113          BNE CLOCK2      ;IF NOT, RETURN
6214: 9C 83 62         114          STZ TICKS       ;CLEAR TICKS
6217: EE 82 62         115          INC SECONDS     ;ADVANCE SECONDS
621A: AD 82 62         116          LDA SECONDS
621D: C9 3C            117          CMP #60         ;ROLL MINUTES?
621F: D0 1A            118          BNE CLOCK2      ;IF NOT, RETURN
6221: 9C 82 62         119          STZ SECONDS     ;CLEAR SECONDS
6224: EE 81 62         120          INC MINUTES     ;ADVANCE MINUTES
6227: AD 81 62         121          LDA MINUTES
622A: C9 3C            122          CMP #60         ;ROLL HOURS?
622C: D0 0D            123          BNE CLOCK2      ;IF NOT, RETURN
622E: 9C 81 62         124          STZ MINUTES     ;CLEAR MINUTES
6231: EE 80 62         125          INC HOURS       ;ADVANCE HOURS
6234: AD 80 62         126          LDA HOURS
6237: C9 18            127          CMP #24         ;ROLL DAY?
6239: F0 02            128          BEQ CLOCK3      ;IF YES
623B: 18               129  CLOCK2  CLC             ;SHOW WE PROCESSED
623C: 60               130          RTS             ;RETURN FROM INTERRUPT
623D: 9C 80 62         131  CLOCK3  STZ HOURS       ;CLEAR HOURS
6240: EE 7F 62         132          INC DAY         ;ADVANCE DAY
6243: AD 7F 62         133          LDA DAY
6246: C9 1D            134          CMP #29         ;POSSIBLY ROLL MONTH?
6248: 90 F1            135          BCC CLOCK2      ;IF NOT, RETURN
624A: AE 7E 62         136          LDX MONTH       ;X = CURRENT MONTH
624D: BC 83 62         137          LDY DAYS-1,X    ;Y = DAYS IN MONTH
6250: E0 02            138          CPX #2          ;FEBRUARY?
6252: D0 08            139          BNE CLOCK4      ;IF NOT
6254: AD 7D 62         140          LDA YEAR        ;LOOK FOR LEAP YEAR
6257: 29 03            141          AND #3          ;LEAP YEAR?
6259: D0 01            142          BNE CLOCK4      ;IF NOT
625B: C8               143          INY             ;BUMP TO 29
625C: 98               144  CLOCK4  TYA             ;A = DAYS IN MONTH
625D: CD 7F 62         145          CMP DAY         ;END OF MONTH?
6260: B0 D9            146          BCS CLOCK2      ;IF NOT, RETURN
6262: E0 0C            147          CPX #12         ;END OF THE YEAR?
6264: D0 0D            148          BNE   CLOCK5    ;IF NOT
6266: EE 7D 62         149          INC   YEAR      ;ADVANCE YEAR
6269: A9 01            150          LDA   #1
626B: 8D 7F 62         151          STA   DAY       ;SET DAY
626E: 8D 7E 62         152          STA   MONTH     ;SET MONTH
6271: 18               153          CLC             ;SHOW WE PROCESSED
6272: 60               154          RTS             ;RETURN FROM INTERRUPT
6273: EE 7E 62         155  CLOCK5  INC   MONTH     ;ADVANCE MONTH
6276: A9 01            156          LDA   #1
6278: 8D 7F 62         157          STA   DAY       ;SET TO FIRST OF MONTH
627B: 18               158          CLC             ;SHOW WE PROCESSED
627C: 60               159          RTS             ;RETURN FROM INTERRUPT
                       160
                       161  ************************
                       162  * CLOCK VALUE STORAGE *
                       163  ************************
                       164
627D: 54               165  YEAR    DFB   84        ;VALUE FOR YEAR
627E: 0A               166  MONTH   DFB   10        ;VALUE FOR MONTH
627F: 0D               167  DAY     DFB   13        ;VALUE FOR DAY
6280: 00               168  HOURS   DFB   0         ;VALUE FOR HOUR
6281: 00               169  MINUTES DFB   0         ;VALUE FOR MINUTES
6282: 00               170  SECONDS DFB   0         ;VALUE FOR SECONDS
6283: 00               171  TICKS   DFB   0         ;VALUE FOR TICKS
                       172
                       173  ***********************************
                       174  * NUMBER OF DAYS IN A MONTH TABLE *
                       175  ***********************************
                       176
6284: 1F               177  DAYS    DFB   31        ;JAN
6285: 1C               178          DFB   28        ;FEB
6286: 1F               179          DFB   31        ;MAR
6287: 1E               180          DFB   30        ;APR
6288: 1F               181          DFB   31        ;MAY
6289: 1E               182          DFB   30        ;JUN
628A: 1F               183          DFB   31        ;JUL
628B: 1F               184          DFB   31        ;AUG
628C: 1E               185          DFB   30        ;SEP
628D: 1F               186          DFB   31        ;OCT
628E: 1E               187          DFB   30        ;NOV
628F: 1F               188          DFB   31        ;DEC
                       189
                       190  ********************************************
                       191  * THIS IS THE SUBROUTINE TO PROCESS A CLOCK *
                       192  * CALL WHEN PRODOS WANTS THE DATE AND TIME. *
                       193  ********************************************
                       194
6290: 08               195  GETIME  PHP             ;SAVE CURRENT STATE
6291: 78               196          SEI             ;DISABLE INTERRUPTS
6292: AD 7D 62         197          LDA   YEAR      ;A = CURRENT YEAR
6295: 8D 91 BF         198          STA   DATE+1    ;STORE IN GLOBAL PAGE
6298: AD 7E 62         199          LDA   MONTH     ;A = CURRENT MONTH
629B: 0A               200          ASL             ;SHIFT IT OVER
629C: 0A               201          ASL
629D: 0A               202          ASL
629E: 0A               203          ASL
629F: 0A               204          ASL
62A0: 2E 91 BF         205          ROL   DATE+1    ;PACK UPPER BIT
62A3: 18               206          CLC
62A4: 6D 7F 62         207          ADC   DAY       ;PACK IN DAY
62A7: 8D 90 BF         208          STA   DATE      ;STORE MONTH/DAY
62AA: AD 80 62         209          LDA   HOURS     ;STORE HOURS
62AD: 8D 93 BF         210          STA   HOUR
62B0: AD 81 62         211          LDA   MINUTES   ;STORE MINUTES
62B3: 8D 92 BF         212          STA   MINUTE
62B6: 28               213          PLP             ;RECOVER STATE
62B7: 60               214          RTS             ;AND RETURN

--End assembly, 263 bytes, Errors: 0
```

clock" subroutine. In other words, any calls to the MLI that requires a date and time stamp will be handled as if a clock card were installed. Finally, before we return to the system, the CLI instruction in line 85 starts the clock into motion.

The code in lines 104 to 188 forms the "clock ready" subroutine. When interrupts are enabled and an interrupt occurs, ProDOS will try to service it by calling up to four interrupt handlers that can be installed. If a given handler doesn't "see" its interrupt, it sets the carry flag and returns; this tells ProDOS to try the next handler. In our program, lines 104 to 109 will return carry set to ProDOS if the VBL signal did not create the interrupt.

If the VBL signal did generate the interrupt, a tick is counted in lines 110 to 113. If the number of ticks is not 60, carry is returned clear to ProDOS and the interrupt is dismissed to allow the system to go on its merry way. When the number of ticks reaches 60, the ticks are cleared and a second is counted in lines 114 to 118. If the number of seconds is not 60, carry is returned clear to dismiss the interrupt. Lines 119 to 123 take care of minutes and lines 124 to 130 take care of hours in a similar fashion.

When we reach midnight, the logic becomes a bit more complicated. Lines 131 to 135 quickly take care of advancing to the next day if the incremented day is 28 or less. Beyond that, the number of days in a month (and leap year with its pesky 29 day month of February) must be taken into account. Lines 136 to 146 perform this task.

Lines 147 to 159 finish up the work required for advancing the month and the year. This code is followed by the data area for the year, month, day, etc. which is constantly updated by the code just described. If you are working with APPLESOFT and want the current date and time, a simple statement of the form

B = PEEK (48904) * 256 + 125

points you to the current year. Then, for example, PEEK(B+3) gives you the current minutes. Assembly language people will soon note that 48904 converts to $BF08 which is the high byte of the JMP instruction to the "clock card" code used by the MLI.

Lines 195 to 214 provide the MLI with "clock card" capability. In other words, when the MLI wants the current date and time, it performs a JSR $BF06 which, for this code, ends up at line 195. Note the code in lines 195 and 196. The MLI and the clock code just described operate completely independently. Therefore, when the MLI wants the date and time we want to avoid the situation where, for example, seconds are picked up as 59 and a clock interrupt occurs before the seconds are reset and minutes updated. The result would be a time one minute less tha it should be. Similar examples exist for the change of an hour, day, etc.

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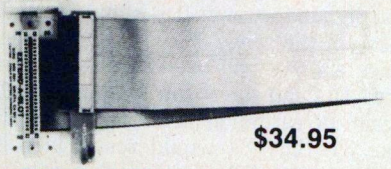

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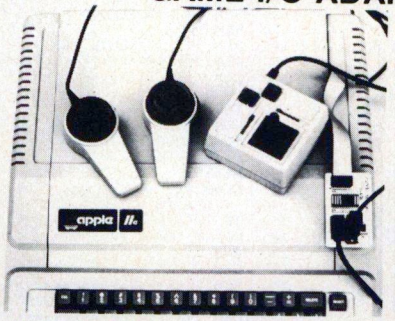

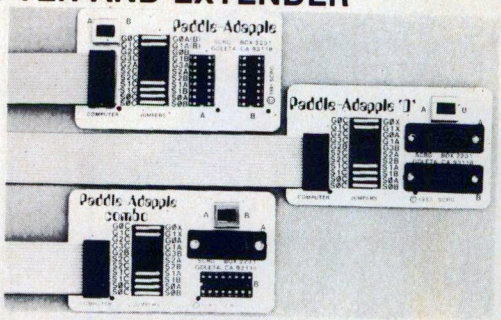

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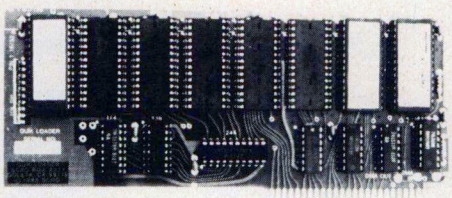

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The quikLoader has eight sockets for EPROMs. These sockets can accommodate standard EPROMs from 2716 to 27512. These types can be freely intermixed. The memory capacity of the quikLoader depends on the EPROMS used. For example, the 2716 can hold 2K of programs, and the 27512 can hold 64K. (Frankly, the current costs of the 27512 is prohibitive,but should come down drastically in the next year.) At this writing, the least cost-per-bit is provided by the 2764, which can hold an 8K program. Using these "chips", the quikLoader becomes a 64K ROM. Using larger capacity EPROMs allows it to become a 128K, 256K, or even a 512K card. If more memory capacity is needed, the quikLoader operating system supports multiple quikLoaders.

INCREASED DISK CAPACITY

Since DOS is loaded from the quikLoader every time the computer is turned on, it is not necessary to take up valuable disk space with DOS. This will give you more than 5% additional space for programs and data on your disks.

ABOUT THE DESIGNER

The quikLoader was designed by Jim Sather, author of UNDERSTANDING THE APPLE][(forward by Steve Wozniak), published by QUALITY SOFTWARE (21601 Marilla Street, Chatsworth, CA 91311 (818) 709-1721).

SYSTEM REQUIREMENTS

The quikLoader plugs into any slot of the APPLE][+ or //e. If used in a][+, a slightly modified 16K memory card is required in slot 0. A disk drive is required to save data.

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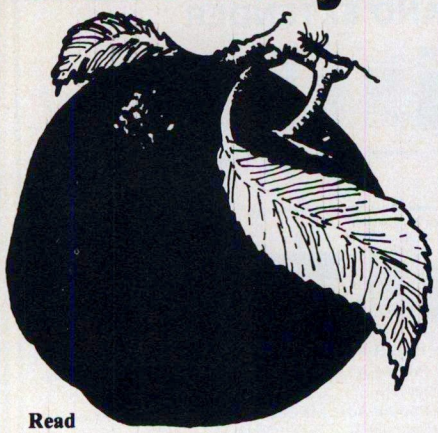

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Circle 64 on Reader Service Card

Listing 2

```
100  REM  ****************************************
110  REM  * PROGRAM TO GENERATE ASSEMBLY LANGUAGE *
120  REM  *        LOAD MODULE FOR IIC CLOCK       *
130  REM  *                  BY                    *
140  REM  *     CECIL FRETWELL AND GARY LITTLE     *
150  REM  ****************************************
160  REM
170 T = 0
180  FOR I = 1 TO 263
190  READ I%
200  POKE 25008 + I,I%
210 T = T + I%
220  NEXT I
230  READ I%
240 T = T + I%
250  IF T <  > 0 THEN  PRINT "ERROR": END
260  PRINT  CHR$ (4);"BSAVE IIC.CLOCK,A$61B1,L263"
270  END
280  REM
290  REM  ****************************************************
300  REM  * HERE IS THE ASSEMBLY LANGUAGE CODE FOR THE CLOCK *
310  REM  ****************************************************
320  REM
330  DATA  120,169,1,32,245,190,176,34,141,250
340  DATA  97,133,7,141,8,191,100,6,160,0
350  DATA  185,0,98,201,98,208,2,165,7,145
360  DATA  6,200,208,242,32,0,191,64,247,97
370  DATA  144,1,0,173,18,196,141,254,97,162
380  DATA  196,160,64,169,8,32,251,97,169,76
390  DATA  141,6,191,169,144,141,7,191,88,96
400  DATA  2,0,0,98,108,254,97,0,196,216
410  DATA  173,124,7,41,8,208,2,56,96,238
420  DATA  131,98,173,131,98,201,60,208,39,156
430  DATA  131,98,238,130,98,173,130,98,201,60
440  DATA  208,26,156,130,98,238,129,98,173,129
450  DATA  98,201,60,208,13,156,129,98,238,128
460  DATA  98,173,128,98,201,24,240,2,24,96
470  DATA  156,128,98,238,127,98,173,127,98,201
480  DATA  29,144,241,174,126,98,188,131,98,224
490  DATA  2,208,8,173,125,98,41,3,208,1
500  DATA  200,152,205,127,98,176,217,224,12,208
510  DATA  13,238,125,98,169,1,141,127,98,141
520  DATA  126,98,24,96,238,126,98,169,1,141
530  DATA  127,98,24,96,84,10,13,0,0,0
540  DATA  0,31,28,31,30,31,30,31,31,30
550  DATA  31,30,31,8,120,173,125,98,141,145
560  DATA  191,173,126,98,10,10,10,10,10,46
570  DATA  145,191,24,109,127,98,141,144,191,173
580  DATA  128,98,141,147,191,173,129,98,141,146
590  DATA  191,40,96
600  DATA  -29577
```

So while we build the ProDOS form of the date and time in the standard locations $BF90 to $BF93 in the global page, we lock out interrupts for a very short period of time. This lock out is not serious because if a VBL interrupt occurs during the lock out, that interrupt will be processed as soon as interrupts are enabled again in line 213.

A word about the APPLESOFT program to place the clock code on disk (Listing 2). If you enter and run it and it bombs with the ERROR message, you made a mistake in your entry. You can tell if the code is properly stored if the program exits with no ERROR message.

Starting the Clock

Listing 3 gives an APPLESOFT program to start up the "clock card". When this program is run, line 170 loads the clock code from disk but does not fire up the clock. Lines 180 to 980 provide for entry of the date and time at which the clock is to start running. There is no magical way for us to keep the clock going if you turn off your *//c* and go to bed.

After the screen is cleared, line 13 of the screen will show

ENTER DATE: DD-MMM-YY

You must enter two digits for the day of the month. Therefore, a leading zero may be required. Without making the code horribly longer than it is, the best we can do is check for a first digit in the range 0 to 3, a last digit in the range 0 to 9, and a final day value in the range 1 to 31. Violate these rules and we will overwrite your efforts with DD and force you to enter the day again. Be careful in all entries. Something like 31-JUN-84 would result in some weird date and time stamps.

Once the day is entered and the cursor moves to the MMM month position, you can change your mind about the entered day and use the ESC key to return to the beginning of the date entry. If you don't enter a standard month abbreviation such as JUN (See line 180 for the legal month abbreviations), we will overwrite your efforts with MMM and force you to enter the month again or use ESC to completely start over again.

Once the month is entered and the cursor moves to the YY position, you can change your mind about the date and use the ESC key to return to the beginning of the date entry. Legal YY characters range from 00 to 99. Outside of this range, we force you to enter YY again.

Once the date is entered, we drop you down to line 18 and show

CORRECT? Y/N

Press N and we let you do the date again. Press Y and we proceed to the time

Listing 3

```
100  REM  ************************************************
110  REM  * PROGRAM TO SET UP IIC CLOCK THEN ACTIVATE IT *
120  REM  *                    BY                         *
130  REM  *        CECIL FRETWELL AND GARY LITTLE         *
140  REM  ************************************************
150  REM
160  HOME
170  PRINT  CHR$ (4);"BLOAD IIC.CLOCK"
180 MO$ = "???JANFEBMARAPRMAYJUNJULAUGSEPOCTNOVDEC"
190  VTAB 12: PRINT
200  PRINT "       ENTER DATE: DD-MMM-YY";
210  REM
220  REM   -READ DAY INTO DD
230  REM
240  HTAB 20: PRINT "DD";: HTAB 20
250  GET A$: IF (A$ < "0") OR (A$ > "3") GOTO 240
260 DD =  VAL (A$): PRINT A$;
270  GET A$: IF (A$ < "0") OR (A$ > "9") GOTO 240
280 DD = DD * 10 +  VAL (A$): PRINT A$;
290  IF DD > 31 OR DD < 1 GOTO 240
300  REM
310  REM    GET MONTH INTO MM
320  REM
330  IF  ASC (A$) = 27 THEN 190
340  HTAB 23: PRINT "MMM";: HTAB 23:COUNT = 1:M1$ = ""
350  GET A$: IF  ASC (A$) > 96 THEN A$ =  CHR$ ( ASC (A$) - 32)
360 M1$ = M1$ + A$::MM = 4
370  IF M1$ =  MID$ (MO$,MM,COUNT) THEN  GOTO 400
380 MM = MM + 3: IF MM < 39 THEN  GOTO 370
390  GOTO 330
400  PRINT A$;:COUNT = COUNT + 1: IF COUNT < 4 THEN  GOTO 350
410 MM = (MM - 1) / 3
420  REM
430  REM  -READ YEAR INTO YY
440  REM
450  IF  ASC (A$) = 27 THEN 190
460  HTAB 27: PRINT "YY";: HTAB 27
470  GET A$: IF (A$ < "0") OR (A$ > "9") GOTO 450
480 YY =  VAL (A$): PRINT A$;
490  GET A$: IF (A$ < "0") OR (A$ > "9") GOTO 450
500 YY = YY * 10 +  VAL (A$): PRINT A$
510  REM
520  REM  -REPEAT UNTIL CORRECT
530  REM
540  VTAB 18: PRINT "              CORRECT? Y/N ";
550  GET A$
560  IF A$ = "N" OR A$ = "n" GOTO 190
570  VTAB 13: HTAB 8: PRINT "      "
580  VTAB 15: HTAB 8: PRINT "ENTER TIME: HH:MM  AM";
590  REM
600  REM  -READ HOUR INTO HH
610  REM
620  HTAB 20: PRINT "HH";: HTAB 20
630  GET A$: IF (A$ < "0") OR (A$ > "1") GOTO 620
640 HH =  VAL (A$): PRINT A$;
650  GET A$: IF (A$ < "0") OR (A$ > "9") GOTO 620
660 HH = 10 * HH +  VAL (A$): PRINT A$;
670  IF HH > 12 OR HH < 1 GOTO 620
680  REM
690  REM  -READ MINUTE INTO MI
700  REM
710  IF  ASC (A$) = 27 THEN 580
720  HTAB 23: PRINT "MM";: HTAB 23
730  GET A$: IF (A$ < "0") OR (A$ > "5") GOTO 710
740 MI =  VAL (A$): PRINT A$;
750  GET A$: IF (A$ < "0") OR (A$ > "9") GOTO 710
760 MI = 10 * MI +  VAL (A$): PRINT A$;
770  IF MI > 59 GOTO 710
780  REM
790  REM  -GET AM OR PM
800  REM
810  IF  ASC (A$) = 27 THEN 580
820  HTAB 27
830  GET A$: IF (A$ <  > "A") AND (A$ <  > "a") AND (A$ <  > "P")
       AND (A$ <  > "p") AND (A$ <  > " ") AND (A$ <  >  CHR$ (13))
       GOTO 810
840  IF (A$ = "P") OR (A$ = "p") THEN  PRINT "P";
850  REM
860  REM  -REPEAT UNTIL CORRECT
870  REM
880  VTAB 18: HTAB 2: PRINT "              CORRECT? Y/N ";
890  GET P$
900  IF (P$ <  > "N") AND (P$ <  > "n") GOTO 920
910  GOTO 570
920  VTAB 15: HTAB 8: PRINT "      "
930  REM
940  REM   -INITIALIZE SYSTEM DATE AND TIME
950  REM
960  IF HH = 12 THEN HH = 0
970  IF A$ = "P" OR A$ = "p" THEN HH = HH + 12
980  PRINT : PRINT : PRINT
990  POKE 25213,YY
1000  POKE 25214,MM
1010  POKE 25215,DD
1020  POKE 25216,HH
1030  POKE 25217,MI
1040  REM
1050  REM   -FIRE UP THE CLOCK
1060  REM
1070  CALL 25009
1080  END
```


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entry. Now your screen will show something like

```
DATE: 19-SEP-84
ENTER TIME: HH:MM AM
```

Enter the desired hour in the range 00 to 12. If you don't, we will overwrite your efforts with HH and make you key it again. If you are in the minute entry mode, the ESC key will return you back to the beginning of the time entry. Note that we do not use the military clock notation in the time entry mode. We convert the time to a 24 hour clock later.

The A in AM can be accepted as the default by pressing the RETURN key or you can entere either an upper case or lower case A. If it is in the p.m., enter either an upper case or lower case P. Your display will now show something like

```
DATE: 19-SEP-84
TIME: 07:56 PM
CORRECT? Y/N
```

We are quizzing you regarding the accuracy of the time only. Enter N and we let you try the time entry again. Enter Y with the result of the code in lines 990 to 1070 firing up the clock. We store your efforts in our "clock card" code and in line 1070 "fire up" the clock.

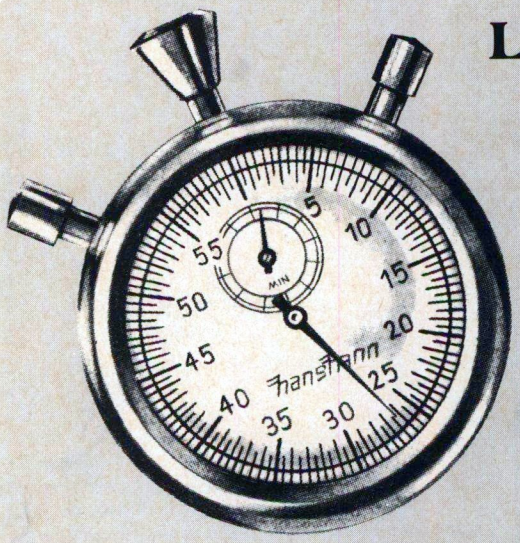
Listing 4

```
100  REM  ***************************************
110  REM  * ROUTINE TO CHECK OUT CLOCK OPERATION *
120  REM  *                  BY                   *
130  REM  *    CECIL FRETWELL AND GARY LITTLE     *
140  REM  ***************************************
150  REM
160 B =  PEEK (48904) * 256 + 125
170 T =  PEEK (B + 5)
180  HOME
190  PRINT  PEEK (B);" "; PEEK (B + 1);" "; PEEK (B + 2);" ";
       PEEK (B + 3);" "; PEEK (B + 4);" "; PEEK (B + 5)
200  IF T =  PEEK (B + 5) THEN 200
210  GOTO 170
```

A Test

For a final program to check this all out, run Listing 4. This short unsophisticated APPLESOFT program will show a continuously running clock that changes every second. Its display is year, month, day, hour, minute, and second—in that order.

We close out our efforts by making you aware of a limitiation of our clock. It will not be totally accurate. When ProDOS performs disk operations, it disables interrupts during each of those operations. Since loading a program, storing a program, etc. can take from several ticks to several seconds, our clock will inevitably lose time. About all we can say is, any clock is better than no clock at all.



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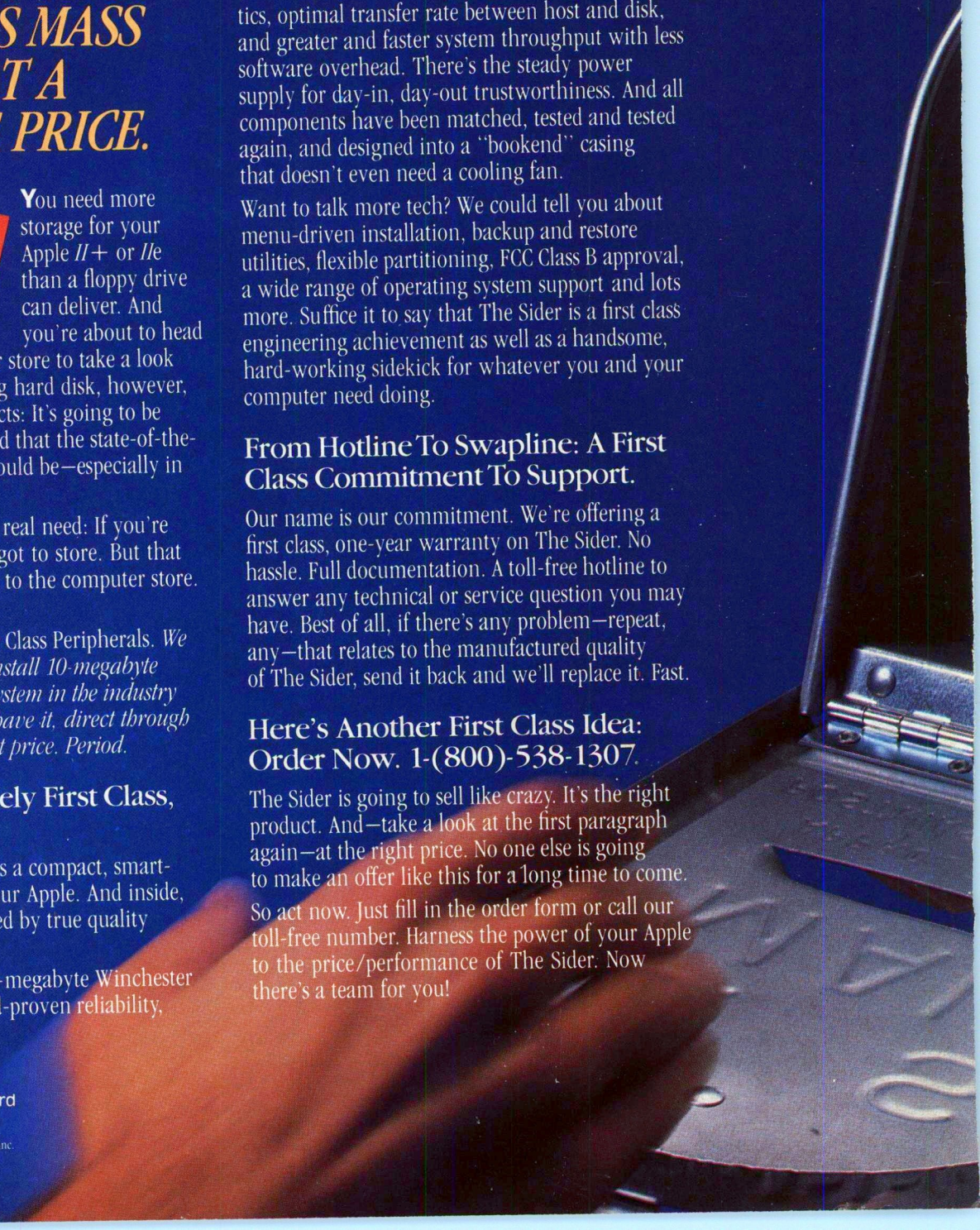

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ProDOS Prose from a ProDOS Pro

Ken Kashmarek

DURING 1984, Apple Computer introduced two new computers with a great deal of fanfare—the Macintosh and the //c. Almost without a whisper, ProDOS also moved onto the Apple // scene. With very little notice, the new Duodisk has replaced the old standard Disk II, and all disk drive sales are now accompanied with ProDOS in place of DOS 3.3. DOS 3.3 is no longer used for new product development. For example, Appleworks and Mouse II are ProDOS based products.

While Apple Computer has not pushed ProDOS in its advertisements, *Call -A.P.P.L.E.* had several articles about the system last year. ProZAP and Apmail.Pro hit the marketplace before Apple Computer was able to get the ProDOS User's Kit to its dealers. As a result, there has been a definite lack of documentation available on ProDOS. Let's take a look at what should be available from your dealer for ProDOS.

The ProDOS Packages

The following information should be accurate. However, check with your Apple Dealer on product numbers and prices.

A. ProDOS User's Kit, A2D2010, $40

Includes the ProDOS User's Disk containing BASIC.SYSTEM, PRODOS, CONVERT, FILER, and STARTUP. The ProDOS User's Manual provides an introduction to ProDOS and the programs on the disk. This package is for current users who want to convert from DOS 3.3. The manual is 149 pages long. The STARTUP program is a menu driven function which takes the user through the initial steps of ProDOS.

B. BASIC Programming With ProDOS, A2D2037, $30

Includes the ProDOS BASIC Programming Examples Disk and manual. The examples disk is very extensive and includes the ProDOS version of APA, the Applesoft Programming Aids. The manual is 255 pages and is very complete.

C. Applesoft Programmer's Kit, A2D2039, $50

Includes the Applesoft BASIC Programmer's Reference Manual, Volumes 1 & 2 (total of 337 pages), and BASIC Programming With ProDOS (manual plus disk, A2D2037).

D. Applesoft Tutorial, A2L2004, $30

Includes a ProDOS addendum, ProDOS based sampler disk and DOS 3.3 based sampler disk. The sampler disk contains programs which are referenced in the Apple //e Reference Manual and the 80 column display documentation.

E. ProDOS Technical Reference manual, A2W0010, $25

Includes the manual (loose leaf, 179 pages) and ProDOS exerciser disk. A three ring binder for the manual is available separately. This package is part of the Work Bench series of programs for the Apple //e. ProDOS MLI calls (Machine Language Interface) are explained in the manual and the exerciser disk allows you to try out the MLI calls directly.

F. ProDOS Assembler Tools, A2W0013, $50

Includes the ProDOS Assembler Tools Disk with editor and assembler, plus manual (approximately 250 pages). The disk also contains a debugger program and relocating loader (from the old DOS Toolkit package). This is another in the Work Bench series of programs. The manual is loose leaf and fits into the same three ring binder with the Technical Reference Manual.

G. Duodisk with Controller, A2M1044

This product replaces the old Disk II. It includes a copy of the ProDOS User's Kit and a DOS 3.3 System Master. This is the standard disk sold with the Apple //e systems, and ProDOS is the standard operating system.

H. DOS 3.3 User's Kit, A2D2040, $60

Includes DOS 3.3 System Master Disk, DOS 3.3 Sampler Disk, DOS 3.3 Users's Manual, and DOS 3.3 Programmer's Manual. While this package is not part of ProDOS, it is available separately for non-ProDOS users.

I. ProFile //, A9M0005

The % megabyte ProFile package includes the hard disk, and Apple II accessory kit. The kit includes the interface card, cable, Backup // which will backup and restore files on the ProFile (including a modified files only option), Pascal ProFile Manager which includes the Pascal support for the ProFile, the Volume Manager Unit, and the extended Filer for Pascal, plus Pascal backup and restore of Pascal files on the ProFile.

J. Pascal 1.2, A2D2041, $250

Pascal 1.2 is an update of Apple Pascal 1.1, with fixes for 1.1 problems, and support for the 128K Apple //e and //c. In particular, goodbye CTL-A if you have the 80 Column Card on the //e. It includes all the Pascal manuals with 1.2 updates. This system runs very nicely from the ProFile and requires ProDOS in order to use the ProFile (ProFile must be formatted by ProDOS before Pascal ProFile Manager can create the Pascal Area).

There are many other products as well including Appleworks, A2S2030, $250, Mouse II, and Apple Access II (communications program) that are all ProDOS based. Appleworks will run on a 64K or 128K //e (80 Column Card required), one or two disk drives, and the ProFile.

What Does This Mean To You?

All new products coming from Apple Computer for the //e will be ProDOS and/or Pascal based. These products may or may not be accompanied by ProDOS support programs. For example, Appleworks is ProDOS based but does not include CONVERT (for your Apple Writer // files), or FILER (for making disk copies). Therefore, sooner or later, you will get ProDOS because it will be necessary if you purchase software from Apple Computer, Inc.

ProDOS is definitely worth the investment. It is faster than DOS 3.3 and takes

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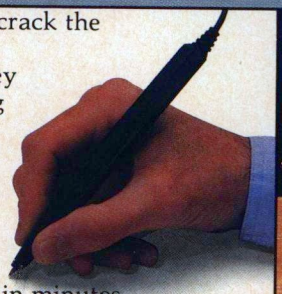

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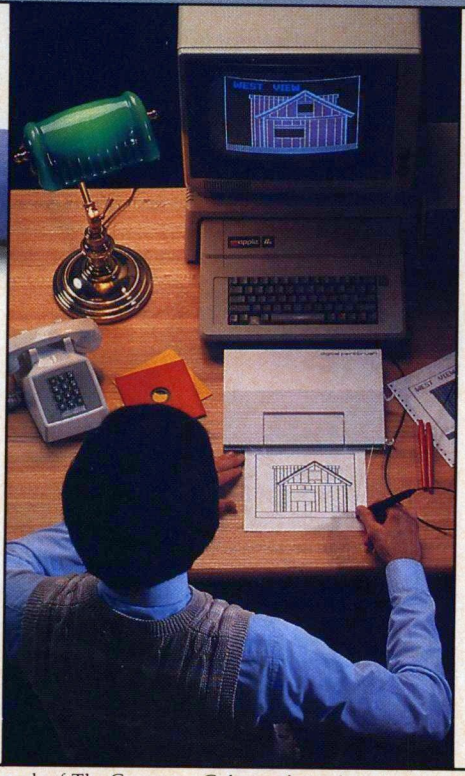

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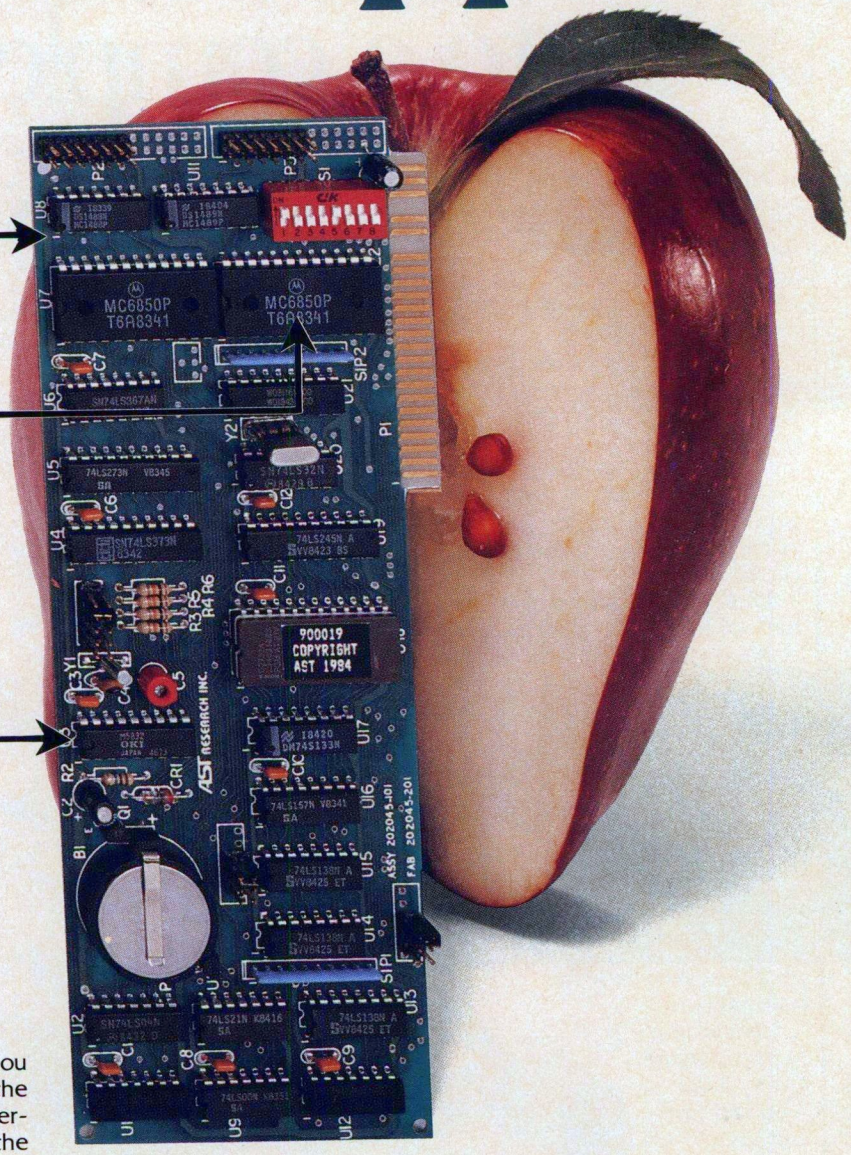

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advantage of the Apple *//e* computer. Files can now be up to 16 megabytes in size, the *//e* auxiliary memory can be used as RAM based disk, 80 column display is directly supported, and files are automatically date and time stamped if you have the appropriate clock card.

Since ProDOS appears to be here to stay, there are many areas about it that could use clarification. Let's begin by going down the BASIC.SYSTEM path (or pathname as it is referred to by ProDOS).

BASIC.SYSTEM

Before proceeding, the first assumption here is that you have both the ProDOS User's Kit and BASIC Programming with ProDOS. These two packages are essential for using ProDOS. The ProDOS User's Kit will come with all new disk drives purchased from Apple Computer (including disk drives that are equipped with an Apple *//e* computer, an extra cost option). If you do not have either package, reading on may help you make up your mind.

ProDOS is considered the operating system on the Apple II+ and *//e* computers, while BASIC.SYSTEM is the file and command handler interface between Applesoft and ProDOS. ProDOS resides in the language card portion of RAM ($D000 to $FFFF) while BASIC.SYSTEM resides in the lower 48K ($9600 to $BEFF; $BF00 to $BFFF is the ProDOS global page while $BE00 to $BEFF is the BASIC.SYSTEM global page). While ProDOS gives you more speed, it also takes more memory. However, the memory is handled more efficiently.

In particular, ProDOS takes over the garbage collection function of Applesoft where possible. Remember Randy Wigington's fast garbage collection routine? While I am not sure that the code is his, the speed bears a remarkable resemblance. Garbage collection takes place at every OPEN and CLOSE, and many times in between if it is necessary. ProDOS is monitoring Applesoft commands, so it knows when to clean up string memory. The ProDOS command, FRE, is used to directly invoke the new routines by using PRINT CHR$(4);"FRE." Applesoft garbage collection can still take place if string space is exhausted while Applesoft is in control during parts of program execution.

Remember DOS 3.3 MAXFILES? How about HIMEM? Well, HIMEM is still with us but MAXFILES has been retired to the bit bucket. Under DOS 3.3, MAXFILES established the bottom of the DOS buffers, while HIMEM established to top of string memory. Quite often, this boundary was one and the same value: $9600. However, under DOS 3.3, HIMEM could be set independently from the bottom of buffers, and binary files or data could be protected between HIMEM and the bottom of buffers. Under ProDOS, HIMEM is now bottom of buffers *and* top of string memory. In addition, HIMEM moves dynamically when files are OPENed and CLOSEd. Beware! You cannot BLOAD to addresses above HIMEM unless special action is taken (more about this later with GETBUFR).

DOS 3.3 actually started at $9D00 while the default three buffers were located from $9600 to $9CF8 (the next seven bytes were not used). Under ProDOS, BASIC.SYSTEM starts at location $9A00. Four pages ($400 or 1024 bytes) are reserved from $9600 to $99FF as a buffer for commands that open and close files within the duration of the command execution (BLOAD, LOAD, CATALOG, etc.) As TXT files are opened, HIMEM is moved down 1K and string garbage collection is performed. HIMEM is moved back up by 1K ($400) when the files are closed.

Where Do My Ampersand Routines Go?

This is not an easy question to answer. According to the ProDOS documentation, the only safe place is page 3 ($300). Assembly language routines can always be made relocatable and appended to your Applesoft programs (documented in several different A.P.P.L.E. publications and elsewhere). One of the simpler techniques is to change the program start location ($67/$68) and load your assembly language routines beginning in page 8 ($800). There is another acceptable method under ProDOS.

BASIC.SYSTEM has a routine which will allocate buffer pages (256 bytes each) which can be used for loading assembly language routines. Listing 1 provides the necessary code that can be added to a STARTUP program to load an assembly language program above the BASIC.SYSTEM command buffer and keep it protected from destruction. There are more sophisticated techniques for loading command extensions and SYS files. These will be discussed at some other time. The assembly listing is also included.

The routines for obtaining buffer pages are GETBUFR ($BEF5) and FREBUFR ($BEF8). The number of buffers to be obtained must be loaded in the accumulator before calling GETBUFR. On return, if the carry flag is clear, the allocation was successful and the accumulator contains the high byte of the buffer address. If the carry is set, then an error has occurred and the accumulator contains the error code. However, in my tests, the carry flag is always clear, even when an error occurs. I had to test for a value of 12 which indicates NO BUFFERS AVAILABLE. In Write -A.P.P.L.E. of April 1984, Cecil Fretwell addresses some additional cautions for using these routines.

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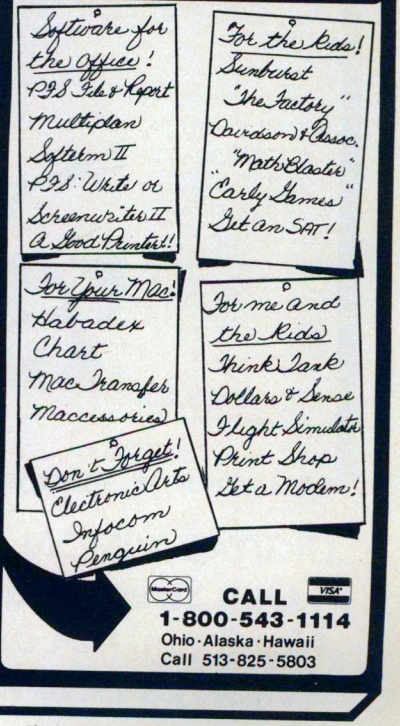

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Listing 1

```
10  PRINT  CHR$ (12); CHR$ (21);:
     TEXT : HOME
20  INVERSE : FOR I = 1 TO 41: PRINT
    " ";: NEXT : HTAB 40: PRINT
    "  ";: NORMAL
30  HTAB 10: PRINT "BINARY FILE L
    OAD DEMO";
40  INVERSE : HTAB 40: PRINT "  "
    ;: HTAB 40: FOR I = 1 TO 41:
     PRINT " ";: NEXT : NORMAL :
     PRINT
50  GOSUB 200: REM LOAD INTERFACE
     ROUTINE
60  POKE 769,4: CALL 768: REM

SET THE NUMBER ACCORDING TO THE
SIZE OF YOUR MODULE.

70 ADDRESS =  PEEK (792) * 256: REM
    BUFFER ADDRESS
80  PRINT "ADDRESS = ";ADDRESS
90 HIMEM =  PEEK (116) * 256
100  PRINT "HIMEM = ";HIMEM
120  PRINT  CHR$ (4)"BLOAD your.p
    athname,A";ADDRESS
130  REM

THE BUFFERS MAY BE FREED BY
POKE 769,0: CALL 768

190  END
200  REM  S.H. LAM ROUTINE
210 H$ = "0300:A9 04 F0 0B 20 F5
    BE C9 0C F0 07 8D 18 03 60 4
    C F8 BE 8D 0F BE 4C 09 BE 00
     "
220 H$ = H$ + "ND9C6G": FOR I = 1
     TO  LEN (H$): POKE 511 + I,
     ASC ( MID$ (H$,I,1)) + 128:
     NEXT : POKE 72,0: CALL  - 1
     44: RETURN

]
```


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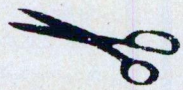

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Needless to say, any assembly language programs that you have been using with DOS 3.3 will need some work in order to function with ProDOS. Depending on the complexity of your programs, this may or may not be a simple task. I have been able to get my routines to work under ProDOS, and even better than under DOS 3.3. I almost never re-boot a disk. When I change to a new program, the cleanest move is -BASIC.SYSTEM ("-" is dash, the new intelligent RUN command).

So, Where Do We Go From Here?

As is usually the case, you can always read about everything that works in the manuals. A point in favor of the new manuals: they are complete and very good. However, not everything works as is sometimes the case with new operating systems. DOS went through several versions before DOS 3.3 became the level that everyone could safely depend on. ProDOS will likely have some changes made to it as well.

In the manual, BASIC Programming With ProDOS, a few changes or known problems should be noted. Page 68 in chapter 5 describes the use of Control-D. It reflects a condition that existed in DOS 3.3, but really no longer exists in ProDOS. Contrary to what the manual says, it is not necessary for Control-D to be preceded by carriage return in order for the ProDOS command to be recognized. In fact, ProDOS will recognize the Control-D anytime as long as it is the first character output by a PRINT command (i.e., PRINT CHR$(4)...). This is an improvement over DOS 3.3 as it is no longer necessary to employ tricks to guarantee that a file command is recognized.

On page 96, table 6-2 describes the use of INPUT. This information is in conflict with the material presented on page 207 which describes INPUT as being able to read any arbitrary string of characters. Ignore the information about INPUT on page 207. Page 207 describes how I would like to have INPUT work, but it just doesn't work that way.

BLOAD and BSAVE have several new options which extend that capabilities of these commands. Among these are the T option (indicating the file type) and the B option (indicating the byte number offset into the file). Thus, it is possible to BLOAD a very large binary file (or any other file type) by bringing in the data in small parts, and getting to the data with the B operand. However, it is not possible to BSAVE a very large file using the B operand. Consider the following command sequence:

```
BSAVE picture,A$2000,L8192,B0
BSAVE picture,A$4000,L8192,B8192
```

which works fine. The net result is a file containing both hi-res pages with a length of 16384 bytes. Now, let's add a third hi-res page to this file:

```
BSAVE picture,A$2000,L8192,B16384
```

The B value of 16384 tells ProDOS to begin adding the data to byte offset 16384 (the end of the file). This doesn't work. Instead, it overlays the picture stored with B8192. It appears that no matter what value is used for B, you can only append to an existing binary file once. The current manual does not indicate that the above will work. The early versions of the manual gave examples on how this would work, but only used the two commands demonstrating how to save both graphics pages. Realistically, you can only BLOAD small parts of a large binary file created with a single BSAVE command. However, the current manual does not give an indication that BSAVE appending (a non-zero value for B) will not always work.

ProDOS has a feature which frees extra blocks when a file is saved to disk and the new length is shorter than the old length. This is great for BASIC files but also shortens binary files. I wanted to use BSAVE with the B operand and L operand to randomly update a part of a binary file. It can't be done. ProDOS shortens the file if the new end of file marker is smaller than the old end of file marker. This would be a nice feature for updating an index file for a data base. Perhaps Apple Computer can add an option to allow this to work. However, ProDOS does *not* shorten text files. If you want a text file to be shorter, you must delete the current file and then re-create it.

Now, there is a definite difference between ProDOS and DOS 3.3 in the text file processing. Under DOS 3.3, the first zero byte found in a text file marked the end of the file. DOS 3.3 would not go beyond that byte and would give end of file (PEEK(222) = 5). However, with ProDOS, end of file is indicated by the end of file marker in the directory entry for the file. Thus, you may have zero bytes anywhere within the file. ProDOS apparently ignores the zero bytes within the file and continues to process. Only when the end of file marker is passed is end of file indicated (your program cannot read past the length value indicated in the directory entry for the file). Listing 2 provides a sample program which illustrates this.

Note that the ENDFILE marker is 27 bytes. Each record is 9 bytes including the carriage return character separating the records (first catalog listing output). Then, the first record is rewritten with a longer record including a zero byte (CHR$(0)). These 14 bytes (including the zero byte and return character) overlay part of the

Listing 1B

```
SOURCE    FILE #01 =>/EDASM/GET.FREE.BUF
0000:                1 ****************************************
0000:                2 * GETBUFR/FREBUFR INTERFACE
0000:                3 ****************************************
0000:          0004  4 BUFFERS  EQU  4          ;FOUR BUFFERS FOR NOW
0000:          BE09  5 ERROUT   EQU  $BE09      ;MESSAGE AND TERMINATE
0000:          BE0F  6 ERRCODE  EQU  $BE0F      ;ERROR CODE
0000:          BEF5  7 GETBUFR  EQU  $BEF5      ;GET BUFFERS
0000:          BEF8  8 FREBUFR  EQU  $BEF8      ;FREE ALL BUFFERS
----- NEXT OBJECT FILE NAME IS /EDASM/GET.FREE.BUF.0
0300:          0300  9          ORG  $0300
0300:A9 04           10 GET      LDA  #BUFFERS   ;NUMBER OF BUFFERS
0302:F0 0B    030F   11          BEQ  FREE       ;ZERO MEANS FREE ALL
0304:20 F5 BE        12          JSR  GETBUFR    ;GO GET'M
0307:C9 0C           13          CMP  #12        ;BUFFER ERROR?
0309:F0 07    0312   14          BEQ  ERROR      ;=> IF SO, QUIT
030B:8D 18 03        15          STA  BUFBYTE    ;SAVE HIGH BYTE
030E:60              16          RTS             ;RETURN
030F:4C F8 BE        17 FREE     JMP  FREBUFR    ;FREE ALL BUFFERS
0312:8D 0F BE        18 ERROR    STA  ERRCODE    ;SAVE FOR MESSAGE
0315:4C 09 BE        19          JMP  ERROUT     ;ERROR MESSAGE
0318:00              20 BUFBYTE  DFB  0          ;HIGH BYTE OF ADDRESS

** SUCCESSFUL ASSEMBLY := NO ERRORS
** ASSEMBLER CREATED ON 14-DEC-83 15:21
** TOTAL LINES ASSEMBLED    21
** FREE SPACE PAGE COUNT    89
```

former second record.

Now, we will look at a flat out error in the current version of ProDOS and BASIC.SYSTEM. The sequence involves text file processing followed by a BSAVE command. If your program processes a text file and goes beyond byte 65535, a potential error situation exists. To handle files up to 16 megabytes, ProDOS keeps an end of file value (the EOF marker) as a three byte counter in the BASIC.SYSTEM global page ($BE00 to $BEFF). The EOF marker is located at $BEC8, $BEC9, and $BECA (48840, 48841, and 48842 decimal). The value is stored in the standard Apple II format (low byte first, high byte next, and extra high byte last). When a program processes a text file beyond byte 65535, then the extra high byte becomes non-zero. If this processing sequence is then followed by a BSAVE command, then the newly created binary file will have in its length (or end of file marker), the same value that previously existed in the extra high byte ($BECA). In other words, the BSAVE command fails to clear out the extra high byte before executing. POKE 48842,0 is necessary prior to executing the BSAVE command in this case. The classic symptom is that the binary file is 65536 bytes longer than it should be.

Progress, Isn't It Wonderful?

At this point, you might be wondering if ProDOS is worth the trouble. After all, there seem to be be a number of problems that make it difficult to use. Quite the contrary, ProDOS is very easy to use. The difficulties pointed out here are intended to make your programming job easier. The outright errors will probably be fixed by Apple Computer. After all, ProDOS has a lot of the features that we have been patching into DOS 3.3 for many years. It is

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Listing 2

```
5  REM LISTING 2
10 D$ =  CHR$ (4)
15  PRINT D$"CREATE TEXT": PRINT
    D$"PREFIX /GENERAL/TEXT": REM
    DELETE THIS AFTER FIRST RUN
20  PRINT D$"OPEN TEST.FILE"
30  PRINT D$"WRITETEST.FILE"
40  PRINT "RECORD 1": PRINT "RECO
    RD 2": PRINT "RECORD 3"
50  PRINT D$"CLOSETEST.FILE"
60  PRINT D$"OPEN TEST.FILE"
70  PRINT D$"READ TEST.FILE"
80  INPUT A$,B$,C$
90  PRINT D$"CLOSETEST.FILE"
100  PRINT "A$=";A$: PRINT "B$=";
    B$: PRINT "C$=";C$
105  PRINT D$"CATALOG"
110  PRINT D$"OPEN TEST.FILE"
120  PRINT D$"WRITETEST.FILE"
130  PRINT "NEW RECORD 1"; CHR$ (
    0)
140  PRINT D$"CLOSETEST.FILE"
150  PRINT D$"OPEN TEST.FILE"
160  PRINT D$"READ TEST.FILE"
170  INPUT A$,B$,C$
180  PRINT D$"CLOSETEST.FILE"
190  PRINT "A$=";A$: PRINT "B$=";
    B$: PRINT "C$=";C$
195  PRINT D$"CATALOG"
```

as fast or faster than most DOS 3.3 look-alike replacement products, comes directly from Apple Computer, and is supported by Apple Computer, Inc. for all new product development.

New products do have problems on occasion. I worked through several levels of the early development copies of the system. Each new level fixed many problems from the earlier levels and added new features that were deemed necessary to make ProDOS a viable product. DOS went through several changes also. Appendix A of BASIC Programming With ProDOS makes the most concise statement about the basis on which ProDOS is built (page 167). You should read it when you get your copy of the manual.

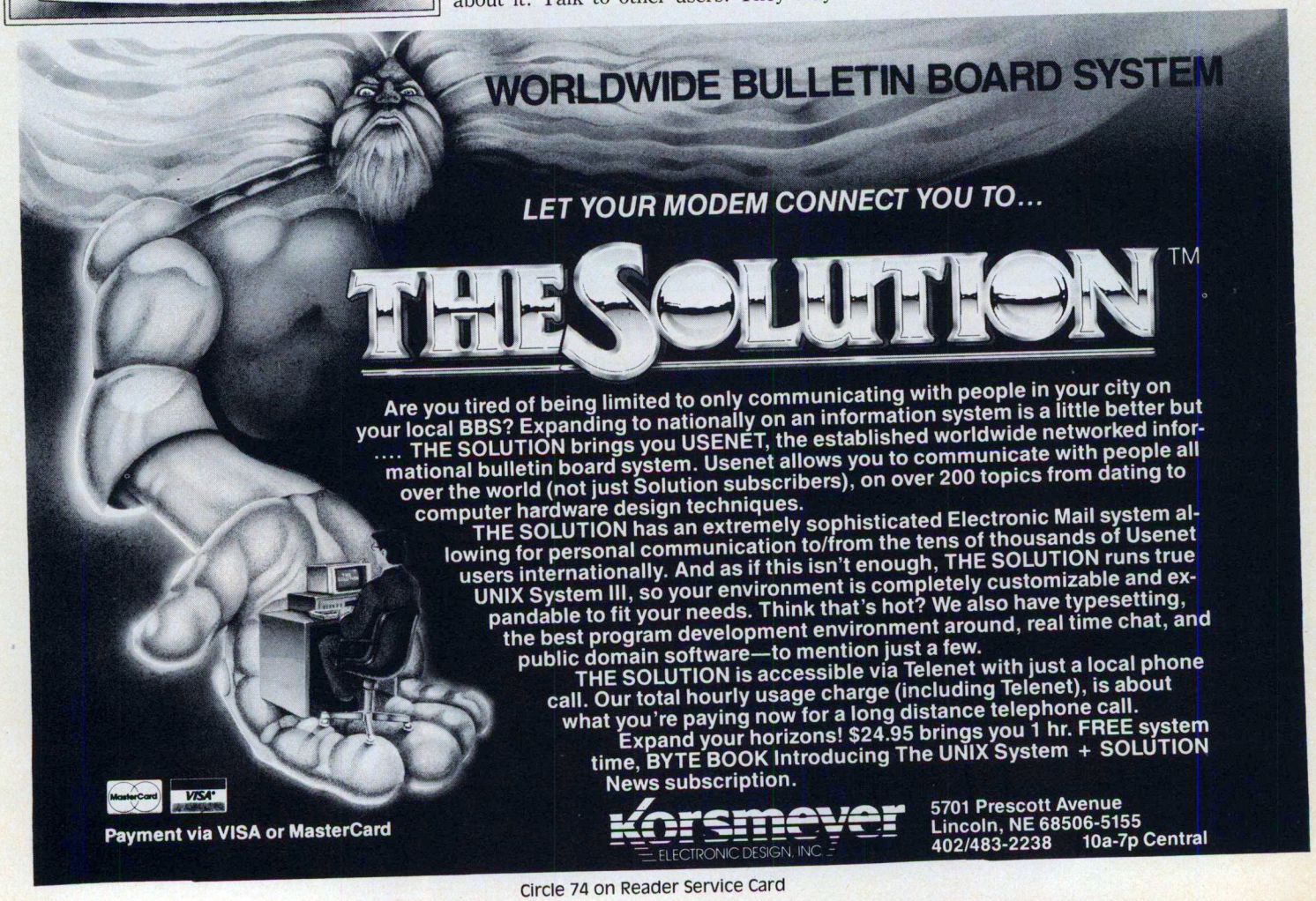
In addition, if you discover a problem with ProDOS, do not sit back and ignore it. First, contact your dealer. He receives technical updates about the product and is best equipped to help you out. If you encounter a real bug, then he will contact Apple Computer about a resolution. All ProDOS packages come with Apple User Input Report forms. Take the time to fill them out very carefully. Document the problem as completely as possible. Make every possible determination on your part that it is a problem in the system. Again, talk to your dealer. He may already know about it. Talk to other users. They may know about it. Use the A.P.P.L.E. Hot Line or A.P.P.L.E. CRATE bulletin board and let other users know. They may have an answer or help for you. In this fashion, you can become a part of getting the problem resolved much sooner.

I had an experience with Appleworks where my Grappler+ Epson MX80 printer combination would not work with the Open Apple H command (screen display to hardcopy print). I called my dealer and he was made aware of it within the previous hour. Apple Computer was also aware of it. Even with that information, I still filled out the Apple User Input Report form. After all, something I had to say about the problem may help to solve it sooner.

By the way, Appleworks adds new files to ProDOS that are not documented in the ProDOS manuals. There are the "snake" files with type ASP, for Appleworks SPreadsheets. Also, a new text file type, AWP, for Appleworks Word Processor, and the data base file type, ADB, for Appleworks Data Base.

Till Next Time

There is much more to talk about, but it will have to wait until future issues. If you have questions or comments, write to us through *Call -A.P.P.L.E.*.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Menumaker

Ken Watters

A GOOD menu is something everyone who does any programming or collects any games needs sooner or later. It really adds that nice, easy-to-use touch to a disk. For a time I found myself writing essentially the same menu program over and over for each new disk. It didn't take long before I realized there had to be a better way. So I wrote a menu program which could be modified by changing just a few lines to fit any situation. It read program titles from a data statement, and was reasonably short. It wouldn't, however, take into account the difference between those programs which had to be "RUN" and those which had to be "BRUN". In other words, there was still some programming which had to be done in order to use the routine with different disks. Well, I didn't mind. So it wasn't too elegant—I was the only one using it.

Let me introduce my neighbor. He owns an Apple, and has not the foggiest idea of how to use the thing. I mean, he can insert a disk, turn the machine on, and sit back and watch the result, but that's about it. He likes to play games, and likes to use various other programs like a word processor, etc., but when it comes to really talking to his machine—well, forget it.

So he was over one night, and I showed him a collection of games I have, and he saw this menu. I mean, he was impressed! No more CATALOF (Beep, SYNTAX ERROR), etc. So, being a generous fellow, I said I'd give him the program. He was delighted until I started to explain what he'd have to do to use it (Well, you see, there's this DATA statement. . . .). No way. Back to the drawing board, as it were.

So I set to work to make the thing self-modifying, and to run any sort of program it might be called upon to. It turns out that one of the best kinds of friends to have is one of the non-programming variety with an Apple. He or she will force you to make a program user-friendly to a degree uncalled for anywhere else.

The Program

The program is really two programs. The first (Lines 5 through 55) modifies the menu program (Lines 60 through 410). First the number of titles is prompted for (Line 25), and then the titles are input

```
        Menumaker by Ken Watters
          - Call A.P.P.L.E.

  5  DIM PGM$(20)
  7 D$ =  CHR$ (4)
 10  TEXT : HOME : PRINT "SO YOU WANT TO MAKE A MENU...."
: PRINT
 15  PRINT "PLEASE PUT DISK YOU WANT MENU ON INTO
THE DRIVE..": PRINT : INPUT "HIT <RETURN> WHEN READY
TO GO ON.";A$
 20  PRINT D$;"CATALOG"
 23   REM  This gets titles -
 25  INPUT "HOW MANY TITLES DO YOU WANT? ";N
 27  PRINT "TYPE EACH TITLE EXACTLY AS IN CATALOG"
 30  FOR I = 1 TO N: PRINT "TITLE #";I;: INPUT PGM$(I): NEXT I
 35  REM  This makes exec file
 40  PRINT D$;"OPEN MAKER"
 41  PRINT D$;"WRITE MAKER"
 42  PRINT "100 DATA ";N;
 44  FOR I = 1 TO N: PRINT ",";PGM$(I);: NEXT I
 45  PRINT
 46  PRINT "DEL 0,59"
 49  PRINT "SAVE MENU"
 50  PRINT "DELETE MAKER"
 51  PRINT "CLOSE MAKER"
 52  PRINT D$;"EXEC MAKER"
 55  END
 59  REM  Next starts menu itself
 60  TEXT : HOME
 65  ONERR  GOTO 400
 70 D$ =  CHR$ (4)
 80  DIM PGM$(20)
 90  REM  The next line will contain titles after menu is made
100  DATA
120  READ N
140  FOR I = 1 TO N: READ PGM$(I): NEXT
200  INVERSE : FOR I = 0 TO 39: PRINT  CHR$ (32);: NEXT
220  PRINT "    SELECT FROM THE MAGICAL MENU      ";
240  FOR I = 0 TO 39: PRINT  CHR$ (32);: NEXT : NORMAL
250  REM  Now print the menu
260  VTAB 8
280  FOR I = 1 TO N: HTAB 5: PRINT  CHR$ (I + 192);")
";PGM$(I): NEXT I
290  HTAB 5: PRINT  CHR$ (N + 1 + 192);") QUIT"
300  VTAB 23: HTAB 16: PRINT "<WHICH?>"
310 Z =  PEEK ( - 16384) - 192: IF Z < 1 OR Z > I THEN 310
320 I = Z: POKE  - 16368,0
330  IF I = N + 1 THEN  HOME : VTAB 10: HTAB 18: PRINT
"BYE": END
335  GR : TEXT
340  HOME : VTAB 10: PRINT "LOADING ";PGM$(I)
360  PRINT D$;"RUN ";PGM$(I)
380  END
400 X =  PEEK (222): IF X <  > 13 THEN  PRINT "A FATAL
ERROR HAS  OCCURRED": END
410  PRINT D$;"BRUN ";PGM$(I)
```

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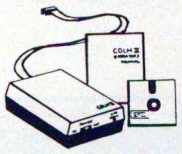

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(Line 30). Next, an EXEC file is created called "MAKER" which writes the DATA statement in Line 100, DELETES the "header," SAVEs the menu program to the user's disk, and finally, committing the supreme sacrifice, DELETES itself.

The main program (starting at Line 60) first sets an "error-trap" in Lines 400 and 410 to detect if a FILE MISMATCH error has occurred. This is what distinguishes between the need to RUN some programs and BRUN others. In Line 120, the number of titles is read, and then in Line 140 the titles themselves. Lines 200, 220 and 240 make up the screen title. Line 220 can be modified to read anything desired so long as it totals exactly 40 characters including spaces. Another line may be added totalling 40 characters if wished. Remember to put a semicolon at the end of each line to supress an extra line feed. Note that a maximum of 20 titles are reserved by the "DIM" statements.

Lines 280 and 290 actually print the menu itself. Line 280 uses the ASCII characters for the alphabet in turn, then prints each title. Line 290 defines the last item in the menu as "QUIT." Line 310 does a keyboard scan to determine which menu item has been selected. If variable "Z" = 1, then item A has been selected; if "Z" = 2, then B, and so on. Note that if Z is greater than the "highest" item, (which is "QUIT") the keypress is ignored. The POKE in Line 320 clears the keyboard so you won't see the key you pressed on the screen. Line 330 tests to see if the item selected was "QUIT" and takes appropriate action. Notice that titles are input as an array, which greatly simplifies the code needed to run them (Line 360). If the program selected is in machine language (a "B" file), an error will occur, and the program will go to Line 400 (remember Line 65?). This will check to see if the error is really "FILE MISMATCH," which is what we should get when trying to RUN a "B" file. If it is not, the program stops. This might happen if you misspell a title when typing them in to MENUMAKER. One final word of explanation – Line 335 gets around the strange bug that wants to display the Applesoft HI-RES screen on the Integer LO-RES screen (If you've never encountered this one, count your blessings!). And, of course, there is alway the challenge for those hack – oh, sorry, I mean programmers who can't leave well enough alone! The program as it is will only accept uppercase input (A,B,C, etc.). A nice modification for Apple *IIe* users would be to have it accept lowercase as well. Something for everyone!

So, enjoy your menus. They should add greatly to the appearance and utility of all of those miscellaneous disks.

PROGRAMMERS: New DAVID-DOS II™

HIGH-SPEED DOS 3.3

DOS-MOVER/FAST-GARBAGE

Makes high-speed disk access under all conditions. DOS-mover frees 10,000 bytes of extra memory for programs. FRE command does ultra-fast garbage collection. Clock or manual disk dating. May be licensed.

100 Sectors in 7 Seconds

Speed Load/Save Applesoft, Binary & Integer 100 sector programs in 7 seconds. Tload/Tsave Random & Sequential Text Files at same speed. Speeds up programs like Home Accountant.

10K More Memory

Use HIDOS command in hello program for turnkey startup, adding 10K free memory to run 30% larger Applesoft programs than ProDOS. Moves DAVID-DOS II and 4 buffers above main memory.

Ultra-Fast Garbage

New FRE command collects a memory full of 6000 strings that are half garbage in two seconds. DOS 3.3 takes 12 minutes. FRE is so fast it is not noticeable during run of most programs.

Clock Dating

Automatic date stamping of disk files is set up for 6 kinds of clocks or Hello manual date entry. New DATE command will auto-insert date in correspondence.

All times in seconds. (Time Test programs available)		DAVID DOS-II	ProDOS	DOS 3.3
TEXTFILES (100 Sectors)	TSAVE	8.0	NO	NO
	TLOAD	6.2	NO	NO
(791 Strings, 32 chars ea)	WRITE	29.3	28.0	88.4
	READ	24.3	16.3	83.8
	PRINT/READ	44.2	45.9	117.1
(442 Sectors, 7 x 500)	APPEND	142.3	142.9	1231.2
APPLESOFT (100 Sectors)	*SAVE	6.4	16.4	33.1
	LOAD	5.0	4.0	23.5
INTEGER (100 Sectors)	*SAVE	6.6	NO	33.4
	LOAD	4.9	NO	23.4
BINARY (100 Sectors)	*BSAVE	7.3	18.4	28.7
	BLOAD	5.8	4.8	24.5
48K PROGRAM SPACE (With 3 Bufs avail)	APPLESOFT	36,352	NO	36,352
	INTEGER	36,352	NO	36,352
	BINARY	36,352	34,816	36,352
64K PROGRAM SPACE (With 4 Bufs avail)	APPLESOFT	46,592	32,256	35,756
	INTEGER	46,592	NO	35,756
	BINARY	46,592	41,728	35,756

*Add 5 seconds for Verify. Apple II, Applesoft & ProDOS are trademarks of Apple

Ten New DOS Commands

1. HIDOS moves DOS above 48K memory.
2. FRE makes ultra-fast garbage collection.
3. DATE stamp files. Clock or manual dating.
4. TLOAD speed loads all Text Files to mem.
5. TSAVE speed saves Text Files from memory.
6. TLIST lists all Text Files to screen/printer.
7. DUMP Binary/Ascii to screen or printer.
8. DISA disassembles Binary to screen/printer.
9. AL prints program Address & Length.
10. / is a one keystroke Catalog.

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All new commands operate identical to old DOS commands on the keyboard & in programs.

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MEMBER BILLBOARD

JANUARY 1985

Don Elman

PDS Plentitude

As you probably know, the "P.L." (Program Library) in A.P.P.L.E. refers primarily to the many volumes of Public Domain Software (PDS) disks that are available to all members for a nominal charge. What you may not know, however, is that we have a newly-expanded, special catalog (not to be confused with the general products catalog) which lists all programs included on every disk in our library. This catalog is organized according to machine or operating system, such as Apple II, Macintosh, CPM, Pascal, etc. There are also disks of the Eamon Adventure series, and programs from other sources including the International Apple Core.

We endeavor to provide this PDS catalog to all members on request for essentially the cost of postage and handling. Because its size has grown in recent months, we have been forced to raise the fee to $1.00, which is still a bargain in anybody's book.

Call -A.P.P.L.E. Disks

While we're on the subject of bargain software, we remind you that programs published in the magazine are available in electronic form through two media. First, members can download programs from a special A.P.P.L.E. section of THE SOURCE. Second, you can order a Disk of the Month from A.P.P.L.E. for $11.00 each plus $2.00 shipping, which becomes available shortly after each issue is published. Please specify which month(s) you are ordering.

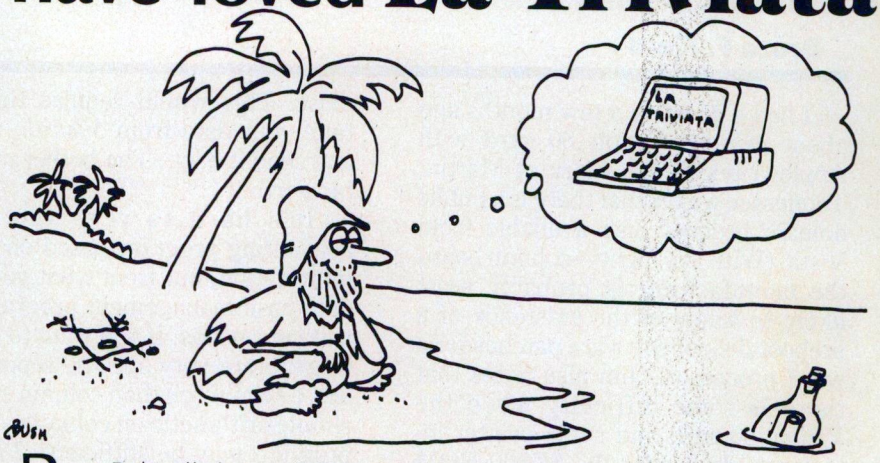
Thanks for the Renewals

A few months ago we sent requests for early renewals to many of you. Your overwhelming response has been most gratifying, and we appreciate your continued support.

New Headquarters

By the time most of you receive this issue, we at A.P.P.L.E. should be settled into new office/store/production facilities, which will enable us to serve your needs even better than before. The new address will be announced in next month's magazine, and in earlier mailings to local members.

Robinson Crusoe would have loved La Triviata



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A.P.P.L.E. Doctor

Bruce F. Field

I had a question a few months ago about using a Vision-80 card with Applewriter II. Jim Clark of Martin, Tennessee writes that there is a public domain preboot disk available from Vista. (With any eighty-column board the manufacturer is probably most likely to know of the existence of a preboot disk or software patches for a word processor.) Jim also notes that there is some difficulty when the Vision-80 card and some printer interfaces clash over the $C800 ROM space — "I get all italics and cannot turn underlining off once it has begun, but the price is right! Besides, one can always print from the 40 column mode."

EXPENSE-IVE SORTING

Q. *I need to be able to keep track of deductible expenses for a year—business expenses, personal deductions, etc. I tried a couple of accounting programs and got fed up—I couldn't recover from an I/O error, couldn't print out all expenses for the year in a particular category, and couldn't include entries from several checkbooks as well as from cash. At the moment I'm using* Visicalc, *with a column for the check ID, one for the payee, one for the amount, and one for an accounting code. But I don't know how to sort these according to accounting code. Could you recommend a sort program that will work with* Visicalc *and an accounting or data base program that will do what I need?*

A. The easiest (but not the least expensive) way to get around the sorting problem with *Visicalc* is to use another spreadsheet program that has sorting capability such as *Multiplan*. All the data you presently have stored in *Visicalc* can be moved over to *Multiplan* without retyping. There is a sorting program available that can be used with *Visicalc* files; a friend remembers it as "Visisort." I have not been able to find any references to this program under the "Visisort" name, but I am assured that it does exist. This would require that you take your data from *Visicalc*, sort it, and send it back. The bother may not be worth it.

It's hard to recommend an accounting program based on a little information, but from what you say a data base management program may suit your needs. If you want to be able to generate very specific reports and don't need more than column sums or simple arithmetic on columns, a filing program may be sufficient. *PFS File* coupled with *PFS Report*, or Apple's *Quickfile* both provide simple filing and sorting with the ability to produce fairly sophisticated reports for small sets of data.

WORD PROCESSOR SCREEN BUG

Q. *When using* Screenwriter *with my Apple II+, how come I'm getting I/O errors when I try to save a "get buffer" to a disk? I thought I could save a couple of pages at least that way, but I keep getting errors when I try to use the file I save via $ as an input file. All that gets saved is from less than one screen to a couple of screens—not all that I put into the get buffer.*

A. Markers are used in *Screenwriter* to set off a piece of text that is to be moved to another part of the document, and this piece of text is stored in the "get buffer." Unfortunately, although the *Screenwriter* documentation claims it is possible to store this buffer to disk, there is a bug in the program that causes it to work incorrectly. There is no known fix at this time, so you'll either have to not use it or bug (pun intended) Sierra for a fix.

MACHINE LANGUAGE DOWNLOADING

Q. *I have an Apple IIe with a Zoom Telefonics Networker modem. I purchased this modem with the software "The Netmaster," and have been having problems downloading programs in machine language. Do you have any suggestions? Does* ASCII Express Pro *work with this modem?*

A. I know of no problems peculiar to the *Netmaster* when downloading binary data. The usual precautions apply; make sure you have set the modem for the same number of bits as the sending system. This is usually 8 data bits with no parity bits for binary data. This is different than with ASCII (text) data where only 7 bits are used and an eighth bit is usually sent as a parity bit. I believe the *Networker* emulates the Apple Communications Card and thus is compatible with *ASCII Express Pro*.

HOT CHIPS

Q. *The IIe uses 4164 DRAM memory chips which are 150 ns chips. Is there any advantage in using 120 ns chips.*

A. The speed with which the memory runs in the Apple is determined by the clock signals. As long as the memory chips are fast enough there is no advantage in using faster chips. On the other hand, if you have a bad chip and all you can get is the faster version it will work fine. In general there is a disadvantage to using faster chips than is necessary. The chips consume more power—creating more heat—and are more expensive.

Before you ask me how to change the clock speed in the Apple to make it run faster, let me point out that the video-generating circuitry is tied in very closely with the microprocessor clock circuits and one cannot be changed without the other. This is why the "speedup" boards on the market have another 6502-compatible microprocessor running at a faster speed on the board.

FILE REVIVAL

Q. *Using Applewriter IIe, I inadvertently saved a blank screen with the same title as my text file. I can view the file using COPY II+ "View Files" program but I cannot retrieve the file for further*

editing. Any suggestions—short of typing it back in again?

A. Every once in a while *Applewriter* hiccups and does the same thing to me. *Applewriter II* and *IIe* save a file with a null character (hex 00) at the end. When you saved the new file all it consisted of was a hex 00 which overwrote the first byte of the old file. All you have to do is use a "disk zap" program that lets you read and write any sector on the disk and change the first byte in the first sector from 0 to some ASCII character—preferably what it was originally.

WAIT-ING FOR AN ANSWER

Q. *I have been trying to understand the "WAIT" command in Applesoft by reading the reference manual, but I don't understand Greek. Could you shed some light as to how and when to use WAIT in programming?*

A. This command is not very popular because it is not very useful. It is designed to stop an Applesoft program from running until some device sends a signal to the Apple, and then the program continues running again. For example, suppose you have a wire from your printer to the Apple that tells the Apple whether or not there is paper in the printer. Let's further suppose that the status of the wire can be found by reading memory location 49296. Memory location 49296 contains a value consisting of 8 bits of information. If the wire is connected so that the 8th bit is a one if the printer has paper and a zero if it doesn't, we don't care about the other 7 bits, they are meaningless in this case. Still with me? Now we have to understand the AND and XOR functions. In this context we are not talking about the Applesoft AND and OR functions. What we are doing here is taking two bytes of data and comparing each bit in a byte with the corresponding bit in the other byte. For instance,

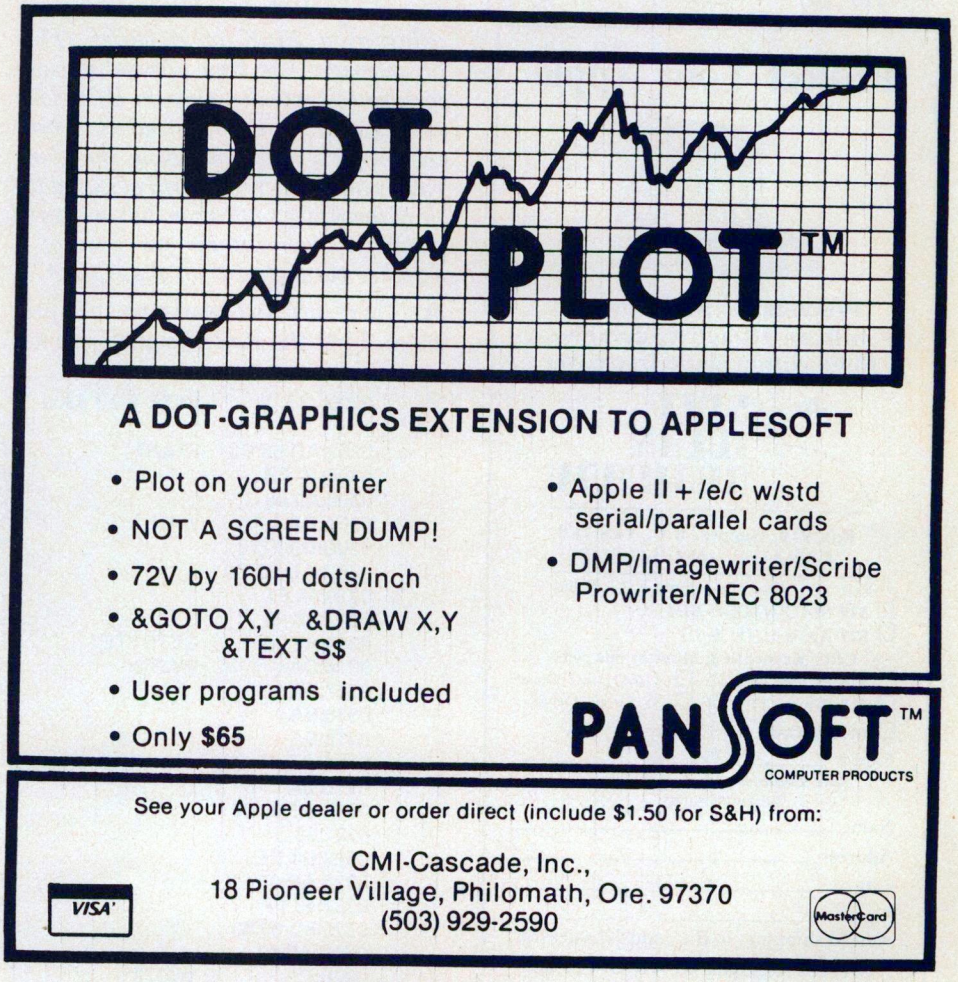
value	binary	
208	11010000	
128	10000000	
128	10000000	AND
80	01010000	XOR

If we AND 208 and 128, for each column where there is a 1 in both numbers (when they are written in binary) there is a 1 in the ANDed result. XOR stands for exclusive-OR and means that there is a 1 in the result everywhere there is a 1 in one but not both of the numbers. Now how do we use WAIT? If WAIT is used with two arguments, the first one is a memory location. WAIT gets the value of this memory location and ANDs it with the second argument. WAIT 49296,128 will get the value at 49296 (our printer status), AND it with 128, and produce either a zero (if the eighth bit is turned off, i.e. the value is less than 128) or a positive number (128, if the eighth bit is on). If the result is positive, Applesoft continues executing the next statement. If the result is zero, it goes back and reads the memory location again. Thus, it "waits" for the value of the memory location to change (to something greater than 128 in this example).

To make this more complicated, suppose the printer was wired backwards and the 8th bit of memory location 49296 was a one if the printer was out of paper. Using our example above the program would wait until you took the paper out, not exactly what you usually want. WAIT can also be used with a third argument to fix this problem. In this case the value of the memory location (the first argument) is XORed with the third argument. For every 1 in the third argument the corresponding 1 in the value gets changed. Then this new number get ANDed with the second argument and if the result is not zero the program continues. WAIT 49496,128,128 XORs the printer status with 128, if the paper is out the 8th bit is a 1 and XORing it with 128 changes it to a zero. Then we AND this result with 128 and since the 8th bit is a zero the result is a zero, and the program does not continue.

The most practical use is with the keyboard. WAIT can be used to wait until a key is pressed and will not display any cursor. Use it like this.

```
100  POKE -16368,0     :REM RESET KEYBOARD STROBE
110  WAIT -16384,128   :REM WAIT FOR KEYPRESS
120  A = PEEK(-16384)  :REM A CONTAINS THE ASCII CODE
```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SELF DIAGNOSIS

Q. *When I tried to boot up a disk, I got the following message:*

```
B6FF- A = D0 X = 5F Y = F0 P = 34 S = F9
*
```

What does that mean?

A. That means you have a problem. Actually Apples spit out messages like this very often when something goes wrong. What it means is that a machine language program, such as DOS or the Applesoft interpreter, has executed some incorrect instructions. The asterisk prompt at the end indicates you are running the Apple's Monitor program that is stored in ROM memory and it is waiting for an input command. The numbers on the line above indicate the address at which the bad instruction was encountered and the status of the microprocessor registers at that time. These numbers almost never provide any useful information for discovering what went wrong. (They are however useful for debugging your own machine language programs where you deliberately insert BREAK instructions to stop execution of the program.)

For your problem where the disk doesn't boot, I would try another disk. If the same problem occurs then try removing and inserting all the peripheral cards (WITH THE POWER TURNED OFF!). Usually the problem is corrosion (oxide) on the contact fingers on the edge of the card and is not particularly visible. Removing and replacing the card causes the contacts in the connectors on the Apple motherboard to scrape away some of the oxide and make a better contact.

SERIAL INPUT THROUGH GAME PORT

Q. *How can I use my game paddle port as an RS232 input? I am currently using the game paddle port as an output with the driver program from the Big Mac disk. Now I want information to go the other direction.*

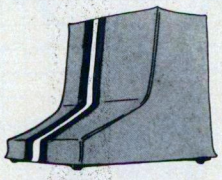
(The other end of the wires from the game port are connected to the RS232 port of my IBM–PC clone, which I am using as a 256K print buffer. This arrangement has been very satisfactory for about six months, since the IBM clone never had anything to say that was worth the Apple's attention. Now the clone finally has something worth at least a little of the Apple's attention, but not worth enough to warrant the purchase of a serial or parallel card for the Apple.)

A. There are two parts to this problem. First the RS232 signals are not compatible with the voltage levels required by the game I/O port of the Apple. RS232 signals are specified for +3 to +15 volts as a space, −3 to −15 volts as a mark. The problem is that the voltages on the game I/O port inputs should not exceed +5 volts or go less than 0 volts. A circuit can be constructed to fix this, consisting of a Zener diode (something in the range of 3 to 4.5 volts) with the cathode (banded end) connected to the pushbutton 2 input and the anode connected to ground, and a resistor (about 200 ohms) from the RS232 output with the other end connected to pushbutton 2 input. The second part of the problem is to convert the serial input to parallel. The program below will do that. The only restriction is that some delay time must added between the characters so that the Apple has time to save them.

Call this routine before sending each character from the clone. This routine gets only one byte and the byte ends up in BYTE at $300. Save it somewhere else in memory and then call the routine again to get the next byte. The routine is relocatable and although is shown starting at $303 it can actually be put anywhere in memory. The timing is set for 9600 baud at three locations, $809, $815, and $82D. For 1200 baud use 64 decimal ($40) at $809 and $82D, and 128 decimal ($80) at $815. (Your may have to play around with these values slightly as the timing of the RS232 signals and your Apple crystal are not always what they should be.) This routine also works well for getting data from a Macintosh.

```
0300                BYTE EQU $300          ;STORE RESULT HERE
                    ;
0303:AD 63 C0       START   LDA PB2        LOOK FOR START BIT
0306:10 FB                  BPL START      ;START BIT IS HIGH
0308:A2 08                  LDX -8         ;9600 BAUD DELAY
030A:CA             WAIT    DEX
030B:D0 FD                  BNE WAIT       ;WAIT TO BIT MIDDLE
030D:AD 63 C0               LDA PB2        ;START STILL THERE?
0310:10 F1                  BPL START      ;NO, FALSE START
0312:A0 08                  LDY -8         ;GET 8 BITS
0314:A2 10          GETBYTE LDX -16        ;DELAY FOR 9600 BAUD
0316:CA             WAIT2   DEX
0317:EA                     NOP            ;DUMMY 2 CYCLE WAIT
0318:EA                     NOP            ;DUMMY 2 CYCLE WAIT
0319:EA                     NOP            ;DUMMY 2 CYCLE WAIT
031A:AD 63 C0               LDA PB2        ;GET BIT VALUE
031D:2A                     ROL A          ;8TH BIT TO CARRY
031E:6E 00 03               ROR BYTE       ;MOVE INTO BYTE
0321:88                     DEY            ;DEC BIT COUNTER
0322:D0 EE                  BNE GETBYTE    ;TOTAL 104 UCYCLES
0324:AD 00 03               LDA BYTE       ;GET BYTE
0327:49 FF                  EOR -$FF       ;INVERT IT
0329:8D 00 03               STA BYTE       ;SAVE IT BACK
032C:A2 08                  LDA -8         ;DELAY FOR 9600 BAUD
032E:CA             WAIT3   DEX            ;WAIT 1/2 BIT FOR
032F:D0 FD                  BNE WAIT3      LAST BIT TO FINISH
```


'Protect Your Apple'



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Something Over 32 Bits

Questions & Answers About Apple's Lisa and Macintosh 32-bit Computers

Dave Redhed

Just to show that this is an equal opportunity column, I will ask a question and let one of our readers (Neil Rieck of Canada) give the answer.

I am still confused. Is the 68000 used in Mac and Lisa a 32-bit computer or not?

I am so tired of '32-Bit Or Not 32-Bit?' discussions (*Call-A.P.P.L.E.*, Oct 84) that I have decided to kick in my own two cents worth in an effort to put this subject to rest. First of all, most general purpose computers use byte-oriented memory because it is more efficient to store ASCII characters that way, and it's also easier to do BCD (Binary Coded Decimal) math. Secondly, CPU bit size is determined by the bit width of the general purpose registers (programmer's view).

Let's look at some examples. DEC's PDP 11 mini-computers are 16-bit machines because their registers are 16 bits wide, even though the memory is byte organized (addressed). The IBM PC uses the Intel 8088 which has an 8-bit memory data bus yet IBM correctly calls it a 16-bit machine because it has 16-bit general purpose registers. The same case can be made for the Motorola 68000 which has registers that are 32 bits wide and a memory data bus that is only 16 bits wide, but byte oriented. Just because the memory data bus is only 16 bits wide doesn't make this chip a 16-bit CPU.

In the end, these kinds of comparisons can be very misleading because they focus on one or two characteristics of a CPU chip. You must also look at the number of registers available, the clock speed and the number of clock cycles required to perform similar instructions, the size and power of the instruction set, the memory size, and the associated special purpose hardware. Most important of all is, "What software is being used?" It wasn't long ago that more than one popular computer company was selling Z80 based machines which ran 8080 software.

Having looked at the tremendous ad campaign of Apple's in a recent Newsweek, I would say that they have already dropped Lisa. There was not a single mention of Lisa as a product which they would like people to purchase. Outside of the statement in Signal which you referenced last month, has Apple made any formal declarations?

Nothing that I would call formal, but *InfoWorld* (Dec 3) did relay a message from Jobs and Sculley that "Lisa won't be going away" (the quote is from *InfoWorld*, not Apple). Then in the Dec 17th issue, *InfoWorld* passes on yet another rumor (from "a reader with an inside track at the computer firm"). The name Lisa is going away, but the basic hardware is going to be retained and modified slightly to make it more compatible with Mac. Apparently, this computer will be a true "Big Mac" as distinct from the "Fat Mac." While I do not have any better information, this last idea is the only one so far that makes sense to me.

I would like to assume that this new computer will run all the current Lisa software, but there is one major problem – the screen. I have heard that Apple is going to stay with the square pixels which Mac has and avoid some of the problems associated with the rectangular pixels in Lisa. From every source I have tapped I hear the same story – there is no hardware fix to permit Mac displays to appear correctly on Lisa or vice-versa. I have not thought it through, but I could easily believe that there is no easy software solution either. This could mean that this next computer might be able to run all the Lisa software, but the displays will appear as strange as Mac displays do on Lisa today. If Apple Computer has their act together, I wish that they would help us ordinary folks out with an explanation—I have some difficulty seeing a well-coordinated plan unfolding with disciplined ease.

How's the ToolKit User's Group doing?

At this point there are 84 members (78 US, 3 Canadian, and 3 foreign) and the first newsletter went out on the 29th of November. Most of the action is yet to come because almost all of the members are still waiting for the 3.0 Workshop so they can run their 3.0 ToolKit.

Is version 2.0 of Microsoft BASIC for the Mac a big improvement over the first version, or is it just bug fixing and a few minor enhancements?

Version 2.0 is a major upgrade which includes many new features as well as increased speed. For those who wish to develop applications, this version supports pull-down menus and permits access to a lot of the ROM routines which developers need. I have not used the new version myself, but I was impressed by a demonstration of it at the SIG meeting in November.

BASIC will run on either the 128K or the 512K Mac, although swapping on the 128K version will slow things down quite a bit. The biggest problem for serious application development on the 128K Mac is the restricted memory.

I am too far away to come to the Lisa/Macintosh SIG meetings but I would like to get the newsletter. What do I do?

The first thing to do is to put your name, address, and member number on a piece of paper along with a request for the Lisa/Macintosh SIG newsletter, and mail it to Lisa & Michael Storrie-Lombardi, P.O. Box 536, Edmonds, WA 98020. There will not be any wholesale mailing of the newsletters until the club can take over mailing it through the bulk mailing arrangements. This requires a minimum of 250 newsletters. However, if you wish to have the current issue, request it and Lisa says she will do her best to get it to you.

Is there any way to shrink the eraser in MacPaint?

Depending on your point of view, sure. If you switch into Fatbits mode it will be a lot smaller in proportion to your drawing. But I imagine that this is not the answer you were looking for. The direct answer to your question is *no*. However, if you had asked whether there were any way to erase with something that gives finer control than the eraser, the answer would be *yes*. If you select a pattern of white and use the paintbrush, you have a wide variety of

"eraser" shapes and sizes. Along with this you have the ability to have a black "eraser" when you are doing white on black drawings.

I keep hearing about some Public Domain Software (PDS) disks for Mac. How do I learn what is on them and how do I get them?

The number of sources for PDS disks is rapidly approaching infinity, but I will mention a couple that I know of which are in the Seattle area. The University Of Washington computer center has a lending library of Mac (and other) software that includes some PDS diskettes which anyone can copy.

Advertised on our own A.P.P.L.E. Crate is a source for PDS; you can get more information by sending a stamped, self-addressed envelope to MacPDS, P.O. Box 85097, Seattle, Wa 98105. Almost all of the Mac user groups are distributing PDS in some form, so you might also look up a group near you. There have been listings of the groups in MacWorld from time to time.

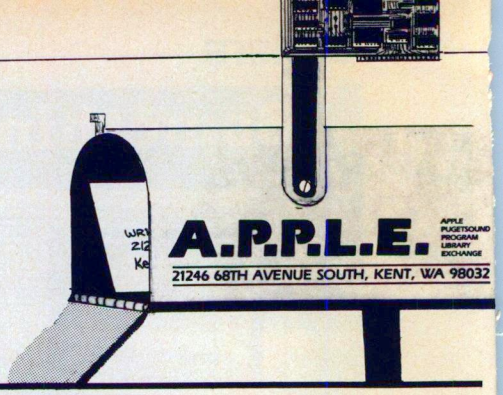
[See this month's Member Billboard for information about A.P.P.L.E.'s PDS Catalog—Editor]

We would like to encourage readers who are interested in Apple's 32 bit computers to send in questions they would like to see answered in this column. Write to : 32 Bit Questions, Call -A.P.P.L.E. Editorial Dept., 21246 68th Ave. S., Kent WA 98032.

LETTERS POLICY

Call—A.P.P.L.E. welcomes letters from its readers on any topic relating to the magazine's content, A.P.P.L.E. services, experiences with hardware and software, current issues in computing, or programming notes. Because of space limitations not all letters can be selected for publication or printed in their entirety, but we try to present a representative sample of your views. If you would like your address published, please include it near your signature.

Write—A.P.P.L.E.



Readers' Forum

Nothing But the Truth

Apple Computer is not neglecting you as you say. Rather they are deliberately punishing you for describing the *//*c as it really is. Other publications have knowingly misled their readers. I have cancelled my subscription to *Popular Computing* for just that reason. (Unreliable information is not what I need more of!) The truth is that Apple computer has spent many millions trying to sell the *//*c as an improvement of the *//*e. The Apple computer club members have been telling people "No, No, not true, buy the e, not the c." Why don't you call Apple Computer, Inc. and ask them how its going? (Locally *//*c are down and dropping, but *//*e's are priced high and nearly sold out).

Now if you will excuse me, I have to go cancel my subscription to BYTE. The Data General/One (BYTE, Nov 84) is about as IBM compatible as a good Expresso Machine. Before trying to stuff and IBM 5¼ inch floppy into the 3½ inch slot on the DG one, read the fine print about how you will need this add-on disk drive and *then* it will run most IBM programs. So will the Expresso Machine. So will the Apple *//*e with a Rana disk drive. Another good magazine sells out its customers (ME) for a few pages of advertising. Good by BYTE.

Thanks for your integrity.

Hank McGill

AppleWorks Audio Alteration

I am very Happy with AppleWorks, but absolutely do *not* like the "beep" it gives on errors. To solve the problem, I looked for and found the "beep" routine and changed it to something more to my liking. I liked the change so much, I thought I'd share my method with other *Call -A.P.P.L.E.* readers. Follow each step and don't leave any out. Make sure you don't try to change your master disk—use *only* a back-up copy!! Then, if you make any errors, you can still start over and try again from the original.

1. Boot a ProDOS BASIC disk—USERS.DISK or EXAMPLES will do—and get into BASIC ("]" prompt).
2. Type CALL-151 to get into the Monitor.
3. Type BLOAD APLWORKS.SYSTEM,A$2-000,TSYS
4. Type 2645L and you will see a disassembled listing of the bell routine. Here is the beginning and end of it:

```
2645 - A0 95      LDY #$95
2647 # A9 95      LDA #$95
                    .
                    .
2658 - 20 F4 1F   JSR $1FF4
265B - 4C E1 14   JMP $14E1
```

5. The routine at $1FF4 does the pause between beeps. It is actually at $2FF4 now, as it is relocated after being loaded. Examine it with 2FF4L:

```
2FF4 - A8         TAY
2FF5 - A2 64      LDX #$64
                    .
                    .
3002 - 60         RTS
```

6. To test the bell, enter this monitor command line:

```
*265A:2F 60
N00:4C 45 26
```

   Now you can make it beep by typing 0G. For multiplying beeps, enter 0GGGGGGG. . .etc.
7. The current settings are:

```
2646:95 = Length
of tone
2648:95 = Pitch
of tone
2FF6:64 =
Length of pause
between tones
```

Experiment until you get what

you like. I like this combination:

```
*2646:30
N2648:48
N2FF6:30
```

Test it with 0GGGGGGGG.

8. When you have the combination you like, restore the patches with:

```
*265A:1F 4C
```

9. Save back to disk with BSAVE APLWORKS.SYSTEM,A$2-000,L6499,TSYS. (You may have to unlock the file first.)

Now boot up the Startup disk and make sure your changes worked and are what you like.

Steven Weyhrich
2401 N. 92nd Ave.
Omaha, NE 68134

Bells Are Ringing

The response to my article, "Call Your Apple" (September 1984), has been overwhelming. Hundreds of readers have been calling, day and night, to hear the Mockingboard answer the phone. I soon learned to set it for one ring and unplug the bedroom phone before going to bed! Some of the callers have brought up some points which deserve to be shared with the other readers.

The Heath Company is currently phasing out the HD-15 phone patch. Heath advises me that you should call their toll-free order line at 800-253-0570 during business hours to check the availability of this item. Overseas callers, and U.S. callers after-hours, should call (616) 982-3411. If they don't have any left at the factory, they can refer you to the nearest branch store which may still have them. As an alternate, I believe the R.L. Drake Company of Miamisburg, Ohio still offers the phone patch. I haven't verified this. Some improvisation will be required if a different patch is used.

One caller thought he was supposed to get the phone patch at Radio Shack. They once sold a patch that was discontinued several years ago, but it was never called HD-15. Only the Heath factory and branch stores have ever sold this item. However, a lot of patches still show up (cheap) at Amateur Radio flea markets ('hamfests'). If you know any ham radio operators, they can direct you to such an event in your area, though it may be several months away.

A few callers complained that they couldn't get Sweet-Micro to come up with the "4050" chip to improve the Mockingboard's voice. It seems the manufacturer has subsequently redesigned the entire card and is no longer interested in supporting the original model. Instead, they want you to exchange your old Mockingboard and, for "only" $125 more, receive a new Mockingboard in its place. This gives you only $40 credit for your old board, at A.P.P.L.E. prices. I'm sure you could sell the old board for at least twice that much at a club meeting or through a classified ad!

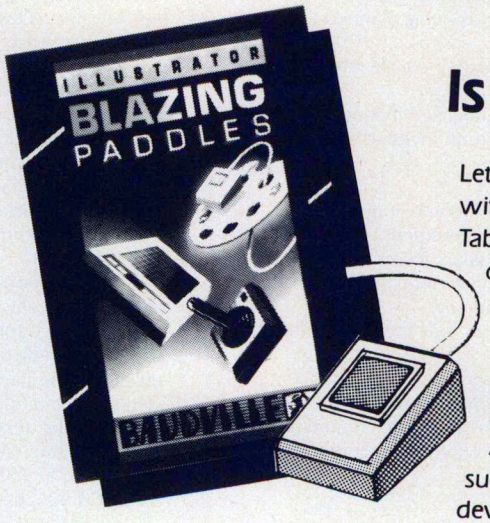
Speaking of speech quality, even the improved speech offered by the 4050 chip got mixed reviews from the callers. Some loved it, while others couldn't understand it at all. It sounds better through a speaker than it sounds on the phone, but not as good as some of the other speech synthesizers I heard at the Chicago Userfest last spring. The most impressive one I heard was the Cricket, which is designed for the *//c*. The new Mockingboard is supposed to be up to par with the newer products, but I haven't heard one.

I have one correction to make to the information given in the article. The parts list (Table 1 on Page 20) and the relay installation detail (Figure 3 on Page 24) both call for a capacitor rated at .01 microfarad. The purpose of this capacitor is to suppress switching transients generated by the relay coil. This capacitor has proven much too small for this purpose; instead, you should use a miniature electrolytic capacitor rated somewhere between 20 and 50 microfarads, and good for at least 25 volts. The positive (+) terminal of the electrolytic goes to the relay terminal that is connected to interface terminal D. If you don't make this change, you may come home to find that the program has hung due to a switching spike on the Apple's 12-volt power bus. This has not happened since I changed the capacitor.

Yours truly,

Clay Ruth

Without Blazing Paddles...



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THE MARKETPLACE

The following items are selected by our editorial staff from the large number of product announcements and news releases sent to us daily. They are presented solely to keep you informed about the current market for Apple related hardware and software. As we have not tested many of these products, appearance here does not necessarily represent endorsement or recommendation by A.P.P.L.E.

RETIREMENT PLANNER

Retirement Planner is an easy-to-use tool for assessing progress toward achieving financial retirement objectives. Retirement Planner is based upon a sophisticated economic model which uses an individual's present and anticpated retirement financial profiles to:

1. determine whether or not the desired standard of living can be acheived.
2. compute adjustments to the present standard of living which must be made to permit the desired retirement standard of living for the desired retirement standard of living for the desired retirement period.
3. compute the maximum retirement standard of living for the desired retirement period which can be supported by the specified pre- and post-retirement financial profiles.
4. compute the maximum retirement period, at the desired retirement standard of living, which can be supported by the specified pre- and post-retirement financial profiles.
5. compute the magnitude of the residual estate, if any.
6. compute and print a composite table and plot of the individual's capital accumulation versus time for several of the situations described above.

Required Input Data

1. Number of years from the present until retirement
2. Number of years for which retirement is being planned
3. Estimated inflation rate
4. Estimated average annual after-tax salary increase rate
5. Present after-tax salary
6. Average annual pre-retirement after-tax fixed income, if any
7. Average annual after-tax rate of return on invested capital
8. Present invested capital
9. Expenditures for the current year
10. Number of years until Social Security income (if any) begins
11. Anticipated Social Security income at retirement time
12. Amount of post-retirement after-tax salary income (if any)
13. Amount of post-retirement after-tax fixed income (such as income from a pension or retirement annuity)
14. Estimated post-retirement expenditures (i.e., the post-retirement standard of living)

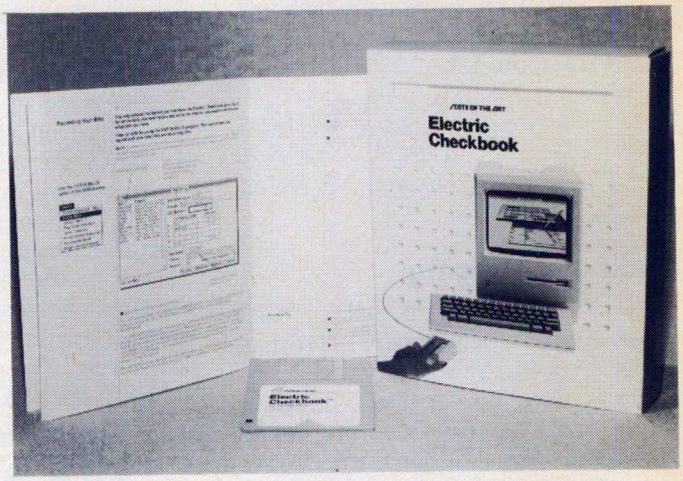
Retirement Planner requires an Apple II computer with 48K RAM, one disk drive, DOS 3.3, 40 or 80 column monitor, and an 80 column printer. Price: $125. *JCW Enterprises, Inc., 25150 Thorndyke, Southfield, MI 48034 (313) 353-7492.*

OPENAPPLEWRITER

Condicom announces a new utility package that eliminates owner lockout and copy protection from your *Applewriter II* and *IIe*. *OpenAppleWriter* fixes and deposits that code on your DOS 3.3 diskette from where it freely runs and can be customized. DOS 3.3 relocation provides compatibility with both ROM Applesoft and *AppleWriter IIe*.

One can run *AppleWriter II* under relocated DOS 3.3. *OpenAppleWriter* allows *AppleWriter* to Applesoft switching under DOS control, INITing of DOS-less data diskettes which provide screen message on attempted boot, inatant access of *AppleWriter II* in Language Card (INT command is replaced with APW command). Instructions and diskette: $39.00. *Condicom, 436 Berry Drive, Naperville, IL 60540 (312) 357-0274.*

PERSONAL FINANCIAL SOFTWARE PACKAGE FOR MAC



A software package for the Apple Macintosh that provides all of the functions essential for personal financial tasks is now available from State of the Art, Inc. Designated the Electric Checkbook, the software is bill-oriented enabling users to set up and record bills on a one-time or recurring basis. Repeat bills can be called up by name, portion of name, reference code or due date. A selective bill payment capability allows users to dictate the time and amount of payment with computer accuracy.

The package handles multiple bank accounts; permits user defined categories for income, expenses, assets and liabilities; provides analysis of all checks by financial category; generates a list of all tax deductible expenses; performs automatic bank reconciliation; handles both handwritten and computer printed checks; and produces detailed financial statements.

Any checkbook activity is immediately updated in the check register and automatically results in a detailed analysis by category. In addition, all checking account functions—checks, deposits, withdrawals—can be viewed immediately on the computer screen. The Electric Checkbook utilizes all the standard Macintosh features including multiple windows, scroll bars and editing functions. For ease of use, the "Help" menu contains on-line text for each function. Included with the software is illustrated, tutorial-style documentation especially written for the novice user. Price: $79.95. *State of the Art, Inc., 3183-A Airway Avenue, Costa Mesa, CA 92626-4618. (714) 850-0111.*

MACBASE

MacBase is a true relational data base program which enables you to place your data fields anywhere on the screen. MacBase is simple to use, powerful in its scope, fast in its execution and useful in its design. Calculated fields appear on the screen—there is no need to wait for a special report program to generate these values. The printed copy will look just like the screen allowing you to use pre-printed business forms. The number of fields is limited only by file space. MacBase will work on a Macintosh with one or two drives or a hard disk. List price: US$195.00. *Eqtron Corporation, Suite 1115, 330 Bay Street, Toronto, Ontario, Canada, M5H 2S8. (416) 361-5002.*

ACCOUNTING SOFTWARE FOR MACINTOSH

Macintosh owners are now able to perform accounting and financial management functions with the Great Plains Hardisk Accounting Series, one of the nation's top-selling software programs for small businesses.

To help launch the Macintosh software and enable dealers to provide customers with hands-on demonstrations, Great Plains is offering a special Dealer Bonus Program. Any dealer who purchases a full set of Macintosh Hardisk Accounting Series modules for resale can purchase an additional set for demonstration purposes at only $75 per module.

Five modules will be available initially, with a suggested retail price of $695 each. The modules, which can be fully integrated or used separately, include General Ledger with Financial Reporting and Budgeting, Accounts Receivable, Accounts Payable, Payroll, and Inventory Management with Point of Sale Invoicing. Job Cost with Estimating, Costing and Pre-Billing will follow early in 1985.

The Macintosh version of the software will operate on either the 128K or 512K Macintosh with a Tecmar hard disk. For information, contact: *Great Plains Software, 1701 S.W. 38th Street, Fargo, ND 58103, (701) 281-0550.*

DOW JONES SOFTWARE

Dow Jones Software has introduced three new programs for the Macintosh that allow the user to access information from Dow Jones News/Retrieval.

Straight Talk, a communications program, allows the user to place information directly into the Macintosh desk accessories, note pad and scrapbook. Straight Talk is currently available at the suggested retail price of $79.

Spreadsheet link directly downloads information into customized spreadsheets in seconds and prints them out moments later, eliminating the need to manually key in the data and ensuring accuaracy. Spreadsheet Link, which must be used in conjunction with Straight Talk on the Macintosh, is now available for the Mac at the suggested retail price of $99.

The Market Manager PLUS, a portfolio management program, maintains accounting information for up to 26 different portfolios and provides for automatic valuation of positions. It is currently available for the Macintosh for $199.

All three programs enable the user to access and download information from the more than 30 databases of Dow Jones News/Retrieval. Information available on News/Retrieval includes the full text of The Wall Street Journal, a complete 20-volume encyclopedia, extensive business and financial information and Dow Jones Quotes, Financial and Investment Services.

FINANCIAL PLANNING SOFTWARE TOOLKIT

The Financial Planning Software Tool Kit for the Apple II family helps businesspeople and professionals perform a wide range of complicated financial calculations quickly and easily. The diskette provides 25 programs that perform many common calculations needed for personal financial planning. These ready-to-run programs require no special knowledge of computers. Apple owners can use this package to quickly evaluate their financial options and choose the most attractive strategies. It will help users calculate monthly mortgage payments, discover the future value of investments, analyze the effects of changing interest rates, and much more.

Features

- Helps you use your Apple to plan and analyze your personal financial affairs
- 25 programs for calculating loans, mortgages, investments, annuities, and depreciation
- This diskette and manual will free you from hours of difficult calculations
- The manual includes precise instructions, required input, and a sample problem and screen display for each program
- Includes a glossary of financial planning terms
- Brings under one roof calculations that are scattered in other, more expensive packages

Tool Kit includes softbound book and diskette for $44.95. Publisher: *Scott, Foresman and Company, 1900 East Lake Avenue, Glenview, IL 60025.*

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TOOLKIT FOR MAC

MacTools puts the power of the Macintosh system into an easy to use disk utility package. It integrates many of the standard disk functions into one program, as well as adding several new features such as:

- Copy Protect/Unprotect
- Verify a disk
- Lock/Unlock files
- Make files visible/invisible

It will also perform the more common disk manipulations:

- Copy files
- Rename files
- Delete files
- Copy a disk
- Rename a disk
- Format a disk

MacTools lets you see all files on a diskette at once, including hidden, locked and protected files. Price—$39.95 from: *Central Point Software, Inc., 9700 SW Capitol Hwy, Suite 100, Portland, OR 97219 (503) 244-5782.*

SOFTWARE CONNECTS EPSON PRINTERS TO MACINTOSH

SoftStyle, Inc. (Honolulu) lets Macintosh owners use Epson printers with their systems. Epstart, availale for $39.95, is a software utility which lets Epson FX- and JX-series printers (and compatibles) produce text and graphics, replacing an Apple Imagewriter. It is compatible with most application software using Macintosh printing standards, including MacPaint, MacWrite, MultiPlan, Microsoft BASIC and others. Epstart also permits printing everything displayed on the Macintosh screen at any time.

Epstart must be installed on each Macintosh application disk, which involves only copying it onto the disk and identifying the printer for which it will be configured. Once installed, applications run normally and Epstart is totally transparent to the user.

Epstart requires a Macintosh, standard printer cable and Epson JX-80, FX-80 or FX-100 printer with an 8143, 8145, 8148 or equivalent serial interface. For additional information contant: *SoftStyle, Inc., 77192 Kalanianaole Highway, Suite 205, Honolulu, HI 96825, (808) 396-6368.*

PROJECT MANAGEMENT TOOL FROM APPLE

Cupertino, CA — Apple Computer is now shipping a project management tool for the Macintosh. MacProject is a powerful business solution that offers the ordinary user flexibility and ease-of-use for designing and scheduling projects.

MacProject enables the user to draw a project schedule on the screen, permitting the user to enter project beginning dates and required task completion dates, resources, and fixed and variable cost data for each task. MacProject then calculates the beginning and ending dates for each task as well as for the entire project. MacProjects features include:

- the representation of project schedules and status through each schedule, task, resource, and tabular charts;
- the ability to calculate and adjust fixed costs, variable costs, and income with tabular display of total costs and net cash flows;
- the calculation of the critical path, or the succession of tasks that determine the final completion date of the project;
- a "what-if" analytical capability that allows instant recalculation of dates, resources, and costs if variables are introduced into the project;
- easy graphic modification of the project tasks and dependencies;
- the ability to cut and paste sections of projects into other project schedules or into files created with MacWrite, as well as the ability to transfer costing data to MultiPlan for further analysis.

MacProject is particularly useful for vertical business environments that require extensive or simple project planning such as advertising, construction, or publishing. Because it is easy to use and visually oriented, MacProject will appeal to people who are unfamilier with formal project management skills.

For example, a manager in charge of an advertising campaign could organize the photography, artwork, copy coordination, market research, and media buying into specific tasks. These tasks are connected by lines indicating task dependencies that lead to a specified goal or milestone. Names and durations for each task would then be entered. Fixed costs associated with each task, as well as any variable costs that may arise, can also be entered. Cash flows can be determined for each part of the project, such as the photography, and for the entire project. By setting an "earliest start" date for the first task, MacProject will then automatically calculate the remaining tasks' beginning and ending dates. By setting a "latest" completion" date for the final task, MacProject will determine tha latest start and completion dates for all tasks. The critical path is also calculated.

MacProject can accommodate up to 200 tasks on the Macintosh 128K, up to 2000 tasks on the Lisa 2 or the Macintosh 512K, and can handle up to 6 resources per task with a maximum of 50 resources per project.

MacProject is available now from authorized Apple dealers and has a suggested retail price of $125.

PRODOS APPLESOFT UTILITY

Applesoft programmers working with the ProDOS operating system now have the help of GALE.PRO, a ProDOS version of the MicroSPARC Global Applesoft Line Editor. MicroSPARC, Inc. has added this ProDOS utility for the Apple *//e* and *//c* to its line of products for users of the Apple II family of computers.

GALE.PRO incorporates all of the features of DOS 3.3 version that have made it popular. These include a line editor that makes editing Applesoft programs as easy as editing with a word processor, a global search and replace command, a cross-variable listing command, a renumber command, automatic line numbering, and display of program pointers. GALE also includes a user-definable macro library, which enables one to use two keystrokes to enter any commands or statements that one chooses. GALE.PRO adds to these commands to enable programmers to use either the 40- or 80-column display on the *//e* or *//c*, and supports switching between the two modes under ProDOS.

GALE.PRO retails for $49.95, which includes postage. MC/Visa, checks, and M.O.s are accepted. The disk includes the two ProDOS versions on one side and four DOS 3.3 versions on the other side. The DOS 3.3 versions are for the 48K Apple II+, the 64K Apple II+, the Apple *//e*, and a special version for use with MicroSparc's Ampersoft, a set of machine language routines designed to extend the Applesoft command set. Current owners of GALE can update to the ProDOS version by sending $10.00 and the original title page from their manual to MicroSPARC. To order GALE, contact: *MicroSPARC, Inc., 45 Winthrop st., Concord, MA 01742 (617) 371-1660.*

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Tax-Prep 85, a personal income tax preparation system incorporating all new tax laws and IRS regulations for the 1984 tax year, has been announced by EZ WARE Corporation. Tax-Prep is designed for users of the Multiplan interactive electronic spreadsheet.

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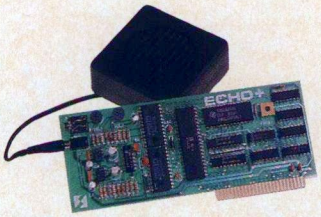

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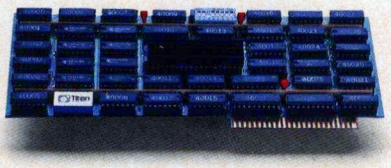

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Visisort

by Bill Fortenberry

Here's a novel program called Visisort. This program sets up an array of 100 elements so that A(1)=1,A(2)=2,...,A (100)=100. After this array is plotted in Hi-Res graphics (the diagonal line), the array is randomly shuffled and redrawn.

Now the fun starts. The scrambled array is sorted with a regular bubble sort, but as the data moves, the graph reflects the move.

The bubble sort is not the fastest but it is the most fun to watch. Any sort routine can be put at the end. In this version, A is the array to sort and N is the number of elements in the array. Now, I hope you enjoy watching all of your sorts.

```
10  REM ************************
20  REM *     VISI-SORT        *
30  REM * BILL FORTENBERRY     *
40  REM *  COPYRIGHT 1982      *
50  REM * BY MICROSPARC INC    *
60  REM ************************
70  HGR : HCOLOR= 3
80  DIM A(100): HOME : VTAB
     22: PRINT "CREATING AR
    RAY": FOR I = 1 TO 100
    :A(I) = I: NEXT
90  HGR : FOR I = 1 TO 100:
     HPLOT I,A(I): NEXT
100  HOME : VTAB 22: PRINT
    "SHUFFLING": FOR I = 1
     TO 100:B =  INT ( RND
    (1) * 100) + 1:T = A(B
    ):A(B) = A(I):A(I) = T
    : NEXT
110  HGR : FOR I = 1 TO 100
    : HPLOT I,A(I): NEXT
120 N = 100
130  HOME : VTAB 22: PRINT
    "SORTING": PRINT ""
140  GOSUB 170
150  PRINT "": HOME : VTAB
    22: PRINT "DONE": END

160  REM BUBBLE SORT: SORT
    N ELEMENTS OF ARRAY A
170 N = N - 0
180 K = N - 1
190  FOR I = 1 TO K
200 L = N - I
210  FOR J = 1 TO L
220  IF A(J) < A(J + 1) THEN
    260
230 T = A(J):A(J) = A(J + 1
    ):A(J + 1) = T
240  HCOLOR= 0: HPLOT J,0 TO
    J,100: HCOLOR= 3: HPLOT
    J,A(J)
250  HCOLOR= 0: HPLOT J + 1
    ,0 TO J + 1,100: HCOLOR=
    3: HPLOT J + 1,A(J + 1
    )
260  NEXT : NEXT
270  RETURN
```

Big Cat

by Patrick A. Clyne

Here is a small program to use as your hello program when you boot your DOS 3.3 disk. The program splits the catalog listing into two columns so you can get up to 42 files on the screen and be able to run any one of them with the touch of one key. Now you don't need to remember how to spell that program that scrolled across the screen when you cataloged the disk.

After displaying the catalog, the program replaces the sector numbers with an ASCII character between two dashes. Pressing any one of these ASCII characters will run the program that is next to the selected character.

To use this program you will have to make sure the file names on your disk do not exceed 13 characters instead of the regular 30.

Enter the program and save it as your HELLO program so when you boot your system this program will run.

How the Program Works

Line 70 changes the catalog format; it uses data line 250. After running this program, if you initialize a disk it will contain the new catalog format.

Lines 80-90 check for the last file on the screen.

Line 100 builds the selected name by reading the screen.

Line 120 replaces the sector numbers with the ASCII codes for you to select your programs.

Line 130 tests to see if the last file in the listing falls into column two. If yes, it prints a blank line for a carriage return.

Lines 140-170 get a selection from the keyboard and test to see which column you selected from. Then it builds a string called **T$** that contains the program you selected.

Line 180 prints the file name and sets FT$ and T$ to the file type and name of selected program.

Lines 190-220 test the file type and then **line 230** runs the program.

```
10  REM ************************
20  REM *   BIG CAT(ALOG)      *
30  REM *  PATRICK A CLYNE     *
40  REM *  COPYRIGHT 1982      *
50  REM * BY MICROSPARC INC    *
60  REM ************************
70  DEF  FN A(X) =  PEEK (4
    0) +  PEEK (41) * 256:
     TEXT : HOME :MEM = ( PEEK
    (978) - ( PEEK (978) >
    127) * 256) * 256 + 29
    47: FOR I = 1 TO 24: READ
    N,D: POKE N + MEM,D: NEXT
    : GOTO 110
80  HTAB H2:BA =  FN A(X):C
    =  PEEK (BA +  PEEK (
    36)): IF C = 160 THEN
     POP : GOTO 130
90  RETURN
100 T$ = "":BA =  FN A(X): FOR
    X =  PEEK (36) TO LE:C
    =  PEEK (BA + X):T$ =
    T$ +  CHR$ (C): NEXT :
     RETURN
110  PRINT  CHR$ (4)"CATALO
    G"
120  FOR V = 3 TO  PEEK (37
    ) + 1: VTAB V:H2 = 1: GOSUB
    80: HTAB 2: PRINT "-";
     CHR$ (V + 30);"-";:H2
     = 21: GOSUB 80: HTAB
    22: PRINT "-"; CHR$ (V
     + 62);"-";: NEXT V
130  IF H2 = 21 THEN  PRINT

140  PRINT : POKE  - 16368,
    0: PRINT "ENTER SELECT
    ION # -->";: GET SEL$:
    P =  ASC (SEL$)

150  IF P - 61 > V OR (P -
    30 > V AND P < 65) OR
    P = 32 THEN 240
160  IF P < 65 THEN  VTAB P
     - 30: HTAB 1:LE = 19:
     GOSUB 100:LE = 5
170  IF P > 64 THEN  VTAB P
     - 62: HTAB 21:LE = 39
    : GOSUB 100:LE = 25
180  INVERSE : HTAB LE:FT$ =
     LEFT$ (T$,1):T$ =  RIGHT$
    (T$,16): PRINT T$: NORMAL

190  IF  ASC (FT$) = 193 THEN
    C$ = "RUN"
200  IF  ASC (FT$) = 212 THEN
    C$ = "EXEC"
210  IF  ASC (FT$) = 201 THEN
    C$ = "RUN"
220  IF  ASC (FT$) = 194 THEN
    C$ = "BRUN"
230  PRINT : PRINT  CHR$ (4
    );C$;T$: END
240  POKE 216,0: INPUT "YOU
     HAVE MADE AN INCORREC
    T ENTRY-PRESS RETURN T
    O CONTINUE:";T$: RUN
250  DATA 1428,15,1439,234,
    1440,234,1441,234,1378
    ,234,1379,234,1380,234
    ,1403,234,1404,234,140
    5,234,1416,32,1417,66,
    1418,174,1421,234,1422
    ,234,1423,234,1320,234
    ,1321,234,1322,234,134
    7,234,1348,234,1349,23
    4,1313,51,1503,48
```

The Magic Cube Solution

by Paul Raymer

This program is really the Ultimate *Solution* to the Magic Cube craze and will only take a moment or two to type.

The critical line is **110** and all of the info must be typed accurately.

The algorithm is buried deeply within **lines 120-140** and, once understood, may be used for all sorts of neat things.

```
10  REM ************************
20  REM *     MAGIC CUBE       *
30  REM *  BY PAUL RAYMER      *
40  REM *  COPYRIGHT 1983      *
50  REM * BY MICROSPARC INC    *
60  REM ************************
70  TEXT : HOME : CLEAR
80 V = 64
90  SPEED= V
100  GOSUB 160
110 A$ = "/EBFUTOJ!FOJ" +  CHR$
    (91) + "BHBN!FMCCJO!SV
    PZ!EBFS!EOB!ZBXB!HOJIU
    !OSBE!FIU!XPSIU"

120  FOR X = V TO 1 STEP  -
    1
130  PRINT  CHR$ ( ASC ( MID$
    (A$,X,1)) - 1);
140  NEXT : PRINT
150  SPEED= 255: END
160  INVERSE : FOR X = 8 TO
    12 STEP 2: FOR Y = 18 TO
    22 STEP 2: VTAB X: HTAB
    Y: PRINT  CHR$ (32): NEXT
    Y: NEXT X: FOR Z = 1 TO
    2000: NEXT Z: NORMAL :
     PRINT : RETURN
```

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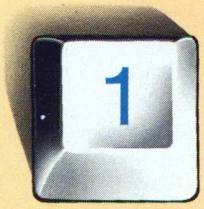

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